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WASHINGTON UNIVERSITY

George Warren Brown Department of Social Work

THE ADJUSTMENT OF THE BLIND TO INDUSTRIAL EMPLOYMENT

by

Lollar Frances Smith

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fulfilment of the requirements  
for the degree of Master of  
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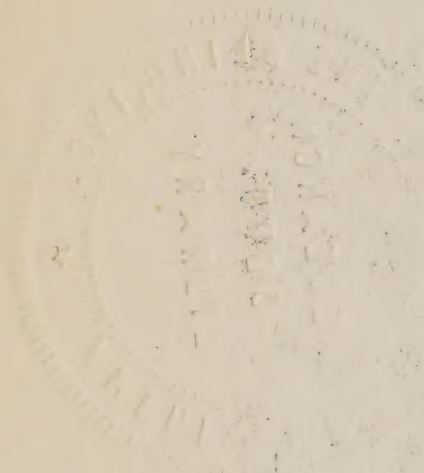
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Deep gratitude is felt towards the individual workers who contributed so generously and enthusiastically to the study. It represented to them an occasion to share in an endeavor that is of great concern to them. It became, therefore, a cooperative project in which each invested a personal interest.

For the untiring assistance and sympathetic interest given by Miss Caroline Singleton, Mrs. Harriet Pierce, and Mr. and Mrs. J. Paul Smith, Jr. in the preparation of this study the writer is also grateful.







## FOREWORD

World War II has forced our country to call upon untapped sources of manpower to keep our production going at its highest level, and thus to keep our Armed Forces supplied with needed materials. Blind persons, who had long remained in the backwaters of our economic life, rallied to the call of industry. They were eager to contribute something to the nation's war effort — confident of their ability to do it — and welcomed this opportunity to convince the sighted world of their competence.

How well have they measured up to their own expectations? How successfully have they demonstrated their competence? Have they been able to adapt themselves to the rigid demands and swift pace of mechanized industry? Are they justified in believing they can be normal employees who assume responsibilities and contribute to production on an equal basis with the sighted? Will they be able to retain their present place in industry and continue to find new opportunities after the war?

This study sought to answer these questions by investigating the entire group of blind workers employed by one defense plant in St. Louis, Missouri. This plant did not hire blind workers prior to January of 1943 and therefore was not designed to meet their handicap. The main objective of this study was to determine the kinds of adjustments these blind workers were able to make in such an industry.

By examining the entire group of workers in one plant, the possibility of bias in favor of the exceptional worker was eliminated. These eighteen workers may typify other groups of blind workers employed elsewhere in the country. Their performance is indicative of the







capabilities of employable blind persons who are as yet unemployed. The facts about these workers therefore will be of great significance to the sighted as well as to the sightless.







## CHAPTER I

### INTRODUCTION

Society traditionally has looked upon the blind as helpless, pitiable persons who endure the greatest deprivation that can afflict humanity. Blindness has meant "living in a world of darkness," a conception which has aroused such intense emotional reactions that these have obscured a real understanding of what this loss actually means to the individual. The tendency of the sighted is to project themselves into the situation of the sightless and conceive of it as a condition which robs him of the use of all his faculties. It is difficult for them to understand this condition realistically since they are not actually experiencing it, and since the majority of them have had little or no association with blind individuals by which they could become enlightened as to the kind of adjustment blind persons are able to make to their handicap.

No one realizes better than the blind that it is a serious loss, that it is a frustration in restricting the freedom of the individual to choose and act as he would desire. To imagine that it renders him helpless or utterly incapable of participating in society as a normal individual is a misconception. Blindness does not prevent normal living for an individual any more than flat feet or any one of a myriad other characteristics.<sup>1</sup> He is a whole being who must lead his life usefully and develop his personality despite his handicap.

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<sup>1</sup>Karsten Ohnstad, The World at My Finger Tips, 1942.







The traditional picture of the blind in the mind of the public has been created by blind men begging on the streets, sitting at home weaving baskets, and appeals from charitable institutions for financial aid to "blind unfortunates." Few realize that in addition to these familiar types there are thousands of men and women trained for work in the professions, trades, industry, and other fields. All of these blind persons are eager for an opportunity to prove their worth.<sup>2</sup>

Even though blind, an individual may possess intelligence, skills, and ability to work and participate in the broader community life. This has been demonstrated in industry during the past thirty years by an increasing number of blind persons who have possessed the initiative and courage to explore work opportunities and secure employment.<sup>3</sup> Despite the position that a few enterprising blind workers have gained for themselves, not until recently have employers provided the opportunities for blind persons to utilize their abilities and skills on a relatively large scale. Although it was almost universally assumed that blindness in itself precluded any possibility for participation in work that required precision, speed, and efficiency, the wartime labor shortage has compelled many employers to set aside these preconceptions and hire blind workers. The blind have met this challenge.

The viewpoint of the employer must be appreciated and understood. Employers are not philanthropists. Factories are organized for production, and whatever social problems exist must be subordinated to the problem of organizing labor and machinery to achieve efficient and profitable

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<sup>2</sup>Enid Griffes, "The Blind Can Do It Better," Harper's Magazine, April, 1943, pp. 522-524.

<sup>3</sup>J. F. Clunk, "Employment of Blind People in Competition with the Seeing," What of the Blind, compiled by Helga Linde, p. 125.







production.

In selecting the labor to run his machines the employer is accustomed to believe that only those workers without physical handicaps are able to do the job. This assumption often ignores many vital factors. For instance, it often does not take into consideration the variations among individual sighted workers, such as initiative, training, and intelligence. A worker may be classed as normal and still not possess one or all of these factors.

The practical industrialist should not be concerned with whether the worker is handicapped or normal per se. His chief concern should be to choose workers, irrespective of their physical limitations, who are best able to perform the job. Efficiency, quality of production, and high output should be vital concerns to which all other considerations are subordinated. If a particular blind worker happens to prove more efficient than a sighted worker, he should be given preference. If the employer still refuses to recognize ability, his judgment is blinded by prejudice. Then he can no longer argue that the impersonal demands of industry force him to disregard the handicapped worker.

This unfounded prejudice still exists, and even now is depriving the nation of badly needed manpower. It is true some employers are using blind persons and finding them to be skilled, efficient workers whose production equals and often surpasses sighted workers. Yet the fact remains that only 2,500 out of approximately 75,000 employable blind workers are actually employed in industry.<sup>4</sup>

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<sup>4</sup>Lawrence Q. Lewis, "Employment of Blind Persons in the United States," Proceedings of the Twentieth Biennial Convention of the American Association of Workers for the Blind, New York, July, 1943, p. 95.







If these potential employees are to take their place in industry they must prove to management that they are capable of performing the same work normally expected of sighted workers. If the blind person desires consideration on an equal basis he must not expect management to adapt the job to him. He must adapt himself to industry. He must not rely upon special mechanical aids, such as the braille microaster to achieve equality with the sighted workers. If he does, he should not blame management for inclining towards the employment of workers who do not involve the company in the expense of special equipment.

Are the blind workers now employed conforming to these exacting requirements of industry? Or, will employers, after labor has become plentiful again, raise the familiar objections to hiring the blind in regular industry? Will they again say, "blind workers are too great a risk?" or, "there are no jobs in mechanized industry which are suitable for the blind." Will they protest "they are not versatile enough to shift from one job to another;" and, "they can not, by virtue of their blindness, measure up to production standards in regard to rate of output, accuracy, and efficiency." Will they charge that the blind are an added responsibility because of their difficulty in getting around the plant, and to and from their jobs?

If these objections were valid, employers would be justified in again closing the doors of industry to the blind after the war is over. The evidence revealed by this study indicates they are ill-founded. This study revealed that the eighteen workers now employed by the Mines Equipment Company have performed eight different types of jobs, including over one hundred and fifty operations, during fifteen months of employment. With no exceptions the entire group measured up to the plant standards for







rate of output and accuracy by at least equalling, and in many instances surpassing, the production of sighted workers. As a group they demonstrated a high degree of versatility. By adapting themselves to the various industrial processes quickly and successfully, they were able to shift from one job to another as the occasion demanded. Not a single accident has been incurred by any of the blind workers since the date of his employment. Furthermore, they achieved complete independence in the performance of their jobs and in getting to and from work, and did not require a disproportionate amount of time and assistance from others in getting about the plant.

The testimonials of several other large manufacturers who are now successfully employing the blind should impress even the most skeptical employer. For instance, the officer in charge of the Spokane, Washington Army Air Depot stated,

When we employed nine blind people little over a month ago, the project was generally regarded as "experimental." Let me say it no longer is! The blind men and women have by their patriotic zeal and accuracy, speed and excellence of work proved beyond the most hopeful expectations that they have a place in our war effort.

As the Personnel Director of the Radio Corporation of America said in regard to the performance of ten blind workers there, "We are well pleased and would not be willing to release the blind individual for an employee who has perfect sight."

An official of Bendix Aviation Corporation declared, "The blind in our plant are doing excellent work.....They have learned to perform precise operations with a degree of accuracy that is astonishing and is comparable to the highest grade of performance that could be expected of anyone not so handicapped." In all, over 100 separate companies now employing blind







workers have made the same optimistic reports.<sup>5</sup>

The blind are making a real contribution to the war effort in these plants. Beyond this contribution, many blind workers are earning for the first time in their lives independent incomes. Equally important, they feel that they are crossing to open up economic opportunity and responsible citizenship for other blind persons. They know that the confidence they inspire among employers will prepare the way for others, including the soldiers blinded in combat in this war. They know that a man's self respect depends not on jobs given out of pity or charity. It depends on those jobs that challenge his abilities in such tangible ways that he feels he is a contributing partner of the society he lives in.

#### Scope of Study

The scope of the study has been limited to a group of eighteen blind workers in one war plant in St. Louis, Missouri. Before the study was undertaken, a survey was made of all the plants in the St. Louis area that employed blind persons, for the purpose of determining what the scope of the study would be. The Glass Equipment Company was found to be the only plant that employed them on a scale sufficiently large to justify an individual study. This plant employed eighteen blind workers whereas other plants employed only from one to five blind workers. The larger group was selected because an intensive study of one homogeneous group would yield better results than a superficial study of scattered groups. The study could be better controlled inasmuch as this group was

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<sup>5</sup>Blind Workers in U. S. Industries. (Photographs and letters from their employers. Compiled by Lawrence Q. Lewis, National Society for the Blind, Washington, D.C.) 1943.





conditioned by one factory environment. The study covered a three month period extending from April through June, 1944.

The definition of blindness drafted by the Committee on Statistics for the Blind and recommended by the Social Security Board was used in appraising the visual handicap of these workers. The definition is as follows: "Visual acuity of 20/200 or less in the better eye with correcting lenses; or visual acuity greater than 20/200 but with a limitation of the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees."<sup>6</sup>

Medical sheets accompanying the worker's personnel cards were examined and it was found that nineteen workers were classified as industrially blind. Later investigations revealed that one of these workers could still see well enough to manipulate machines by sight. This worker was eliminated from the study, leaving eighteen workers who were actually studied.

The objective of this study was to determine the various kinds of adjustment these eighteen blind workers were making to employment in regular industry. Such adjustments could best be indicated by a study of the kinds of work these blind workers were able to perform, of their adaptability to industrial processes and factory environment, and of the way their work measured up to plant standards in regard to the quantity, quality, and efficiency of their work. Their rate of accident in the plant was also examined. Furthermore, it was thought significant to find out what their personal reactions were to this type of employment and to what degree they were accepted in the plant by other workers and by

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<sup>6</sup>Robert Irwin, The Blind, American Foundation for the Blind, New York, 1941. Reprint from Encyclopedia Americana, p. 2.





management.

The subjective approach was followed in determining what the various adjustments were. The appraisal of the blind worker's productivity was based chiefly on the opinions of workers and management, rather than on statistical records. Few consistent records were kept but controlled comparisons were made by the time-motion engineer in some instances. These were used in the study to substantiate the opinion of workers and management. The subjective approach was particularly suitable for this plant, inasmuch as the eight supervisors were unusually observant of the performance of the blind workers. Employment of blind workers was an experiment in this plant and close observation was necessary during the trial period.

The points of view of both worker and management were given in order to dispel any skepticism that might arise if the work were not appraised from all viewpoints. Management was represented by the production manager, eight supervisors in the various departments, and the time-motion engineer. The point of view of the worker was represented by the eighteen employees selected for study. The reports of both groups checked with surprising accuracy.

Although the range of this study is limited, it was felt that certain conditions existing in the Mines Equipment Company would broaden the implications of the study. For instance, the eighteen blind workers were distributed throughout the two plants rather than being localized in one department. As a result they did a great number and variety of operations.

In addition, the variety of personalities, age ranges, and educational backgrounds of these workers represented a fairly good cross section





of what one might expect to find among any small group of blind workers throughout the country. Such a comprehensive range of jobs and diversity of personality types and educational backgrounds should yield conclusions that might apply elsewhere.

### Method of Study

The data were obtained by means of interviews with the blind workers, the supervisors in charge of blind workers, the production manager, and time-motion engineer. An outline was prepared for the interviews with the eighteen blind workers, and a separate outline was prepared for the interviews with the eight supervisors.<sup>7</sup> Three sections of both outlines, relating to actual performance of the workers in the plant, were identical. No outline was used in the interview with the time-motion engineer as he was consulted only for the purpose of obtaining statistical records which he made in comparing the work of the sighted with that of the blind.

Some information was obtained from the production manager in an interview before the study was made. This was supplemented several months later, after the study in the plant had been completed, by enclosing a list of questions in a letter directed to him.<sup>8</sup>

In addition to the outline, a schedule was prepared for the blind workers to be filled out during the interview with them.<sup>9</sup> This schedule called for identifying data such as age, sex, marital status, amount of

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<sup>7</sup>For list of points covered by the two outlines, refer to Appendices A and B, pp. 120-123.

<sup>8</sup>The questions asked and the letter to the production manager are to be found in Appendix C, p. 124.

<sup>9</sup>See Schedule, Appendix D, p. 127.





education, length of blindness, vocational training, and previous employment.

Next, the names, addresses and telephone numbers of the entire group of blind workers employed by Mines Equipment Company were obtained from their application files in the Personnel Office. The visual acuity of each blind worker was checked by referring to the medical examination sheet attached to their application file. This was done to determine whether or not they could be classified as industrially blind.

It is significant to point out here that the application files of blind workers were not segregated from the sighted workers, but were classified alphabetically with the 1500 other employees of the plant. This is consistent with the philosophy of the plant toward the blind workers. The Mines Equipment Company does not consider blind workers as a distinct group which should be accorded special privileges or concessions. They are considered as normal employees of the plant, each contributing his share to the production of essential war materials. Therefore, to obtain the files, the personnel director had to recall the names of all blind workers, and confirm them with the supervisory staff.

After the names, addresses, and telephone numbers had been secured, appointments were made with the individual workers by telephone. Only one worker could not be reached in this manner. A letter was sent asking him for an appointment. The purpose and nature of the visit were explained in the letter. Interviews were held with the blind workers after working hours, in their homes. This was done primarily to prevent interference with vital war production as well as not to encroach on the Company's time. But it had an added advantage in that the condition of leisure hours at home was more conducive to unrestrained conversation, and the securing of





a larger amount of information.

In one case the writer faced a problem in communicating with a worker who was both deaf and blind. This worker, however, had devised a code whereby one could communicate with him by tapping on his arm. The system, similar to the Morse code of dots and dashes, was familiar to several of the workers. The writer picked it up from them, and was enabled in a very short time to conduct the interview successfully. This proved to be one of the most fruitful of all interviews. As the code may be of interest to the reader, it is fully described in Appendix E.

Since the material to be covered in the interviews was extensive and in some cases technical in nature, it seemed necessary to take notes during the interview, in order to keep an accurate record of the statements made. This presented a problem, as the writer herself is visually handicapped and unable to take notes in braille at the rate of ordinary conversation.

It was feared that the presence of a third person at the interview might alter the relationship between writer and worker. In an effort to establish and preserve a responsive relationship, the writer at first decided to waive the assistance of a third person and rely upon her memory for the recording of statements made in the interview.

Two interviews were conducted successfully in this manner, but the plan was abandoned when it was found that too much time was consumed in recording. Since the response of the workers in the first two interviews had exceeded expectation, the writer believed that future interviews could be successfully conducted in the presence of an assistant. This belief was confirmed in all subsequent interviews.

The function of the assistant was explained at the outset and the





worker cooperated by giving ready permission to take notes. The assistant made herself inconspicuous and did not interfere in the conversation, except to verify certain points under discussion. The blind workers were extremely cooperative and expressed their views as realistically, candidly, and accurately as possible. This procedure was tested for two interviews, and after it proved a satisfactory one it was followed during the remainder of the interviews with the workers, as well as with the supervisors and time-motion engineer.

The need for organizing and classifying material is apparent to any research worker. But the need becomes imperative for one who is visually handicapped. If order is not stressed the material will become inaccessible as it grows in volume, with the result that much time will be wasted in searching for particular items. Therefore, to facilitate the analysis of this material, a file system was devised which followed the outlines for the interviews. That is, during the interviews notes were taken on each point listed in the outline, and afterwards the information was transferred to cards fitting into a filing box. This box accommodated approximately 1,500 cards, 5" x 8" in size. Orange index cards were used for each worker, with his name and number on the tab. The names were placed alphabetically in the file box, and numbered from one through eighteen. The supervisors were differentiated from the workers by the use of tan index cards, comprising a section in the file box immediately behind the worker's cards. There were eight sections on the worker's outline, identified by letters running from A to H.<sup>10</sup>

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<sup>10</sup>Refer to outline in Appendix A for names of these sections, p. 120.





The heading of each section along with the points included under that section were placed on signal or dividing cards. These signal cards were separated from the other sections of the outline by a colored tab bearing its appropriate alphabetical letter. Since each section had a group of points to be covered, each of these points was recorded on separate cards behind the divider cards and placed according to its order in the outline. To facilitate referral to any particular item, each of the point cards was marked with the alphabetical letter of the main heading, in addition to the number indicating the position of the points in the outline. For instance, the code numbers on one of the point cards might read B-8-a. These would indicate that the information on this card came under the main heading of B, "Description of Work" in the outline. The number 8 would indicate that this card came under the eighth point in the outline, that is, "Degree of Independence." Further, the small letter a would indicate that this particular card actually carried information on the first sub-point listed under the main point, "Getting About Within the Plant." Also each of the eighteen workers was identified by a number, and this number was placed on every card in his unit.

The coding arrangement made it possible to pull all the cards covering a particular point, for example, the degree of independence of each worker in "Getting About Within the Plant," and make a quick comparison of this independence in all workers. Afterwards, all the cards could be quickly replaced in their exact position in the filing cabinet by simply referring again to the code numbers. This method of collecting and filing the material required an extraordinary amount of time and thought, but it was more than counterbalanced by the time saved in analyzing the data.





The same system was followed in the recording of material obtained from the supervisors, the only difference being that there were six sections to their outline, instead of the eight sections comprising the outline for blind workers.

It might be added that, in addition to the case material, other material relating to the research project was included in the file box. Index cards were used to designate the various types of material, and were labelled with such headings as tables, memoranda, questions, conclusions and bibliography.





## CHAPTER II

## BACKGROUND OF WORKERS

The purpose of this chapter is to give pertinent facts about workers' backgrounds, such as age, sex, age at which blindness occurred, marital status, educational, vocational and job experience.

Briefly, the ages varied anywhere from nineteen to fifty-six years. Among the workers were sixteen men and two women. As to ages when blindness occurred, over half lost their sight before they were ten years old, six more lost their sight between the ages of ten and twenty, and three others became blind between the ages of twenty and fifty-six. Eleven of the eighteen workers were married. Concerning their educational background, one worker completed the seventh grade, four completed the eighth, one completed the tenth, nine graduated from high school, one attended college for one year, and three graduated from college, one attaining an LLB degree. Only one worker had received vocational training of a type to fit him for industrial employment. As to job experience, four had worked in industry, although none had received any prolonged industrial experience.

Age Distribution

As previously pointed out, the ages of workers ranged anywhere from nineteen to fifty-six years. However, the greatest concentration of workers, more than half, fell between the ages of twenty and thirty. The following table will show the distribution of age groups among the workers.





Table 1

## DISTRIBUTION OF AGE OF WORKERS

Age Group	Number of Workers	Percentage of Number of Workers
Total	18	100.0
15-19	1	5.5
20-24	3	16.7
25-29	7	38.9
30-34	1	5.5
35-39	2	11.1
40-44	• • •	• • •
45-49	1	5.5
50-54	1	5.5
55-59	2	11.1

One of the facts not to be overlooked in this table is the large number of workers falling in the young age group. With so many years of potential employment lying ahead of these young blind persons, the need is all the greater for breaking down the barriers of employment opportunities for them.

Age at Which Blindness Occurred

Most of the workers lost their sight at a very early age. Half became blind before they were ten years old, and six more lost their sight between the ages of ten and twenty. Only three became blind after twenty years of age. The following table will give the reader an idea of the various age groups at which blindness occurred.





Table 2

## AGE AT WHICH BLINDNESS OCCURRED

Age Group	Number of Workers
Total	18
At birth	1
Under 1 year	3
1 through 4	3
5 through 9	2
10 through 14	1
15 through 19	5
20 through 29	• • •
30 through 39	2
40 through 49	• • •
50 through 59	1

As to the present degree of vision of these workers, six are totally blind, eight have only light perception, and four have enough vision to distinguish large objects and color in the proper light. Only two workers had physical defects other than blindness, which might be considered to handicap them for employment. One had rheumatic heart disease, and the other was totally deaf.

Marital Status

Of the eleven who were married, six had from one to four children. Seven of those married were married to blind persons, one was married to a person with a serious visual defect, and three were married to persons





with normal vision. It should be pointed out that of the three who were married to persons with normal vision, two were married before they lost their sight.

The reasons for the intermarriage of blind persons is still a moot question. The reason advanced by some blind persons is that they are more likely to find their intellectual equal among the blind. The writer's view is that blind persons are thrown together at schools for the blind, where they tend to be segregated from the company of sighted individuals. Therefore, they do not have the opportunity to meet persons outside their own group. There are strong psychological factors at work here too, such as the bond of understanding that grows from an appreciation of each other's difficulties.

#### Educational Experience

Comparatively speaking, the educational background of these workers is very high. That it is higher than that of most of the sighted workers in the plant is indicated by the statements of plant supervisors who were unanimous in saying the blind were better educated. As pointed out previously, the education achieved by blind workers ranged from the seventh grade in school to an advanced degree (M.A.) in college.

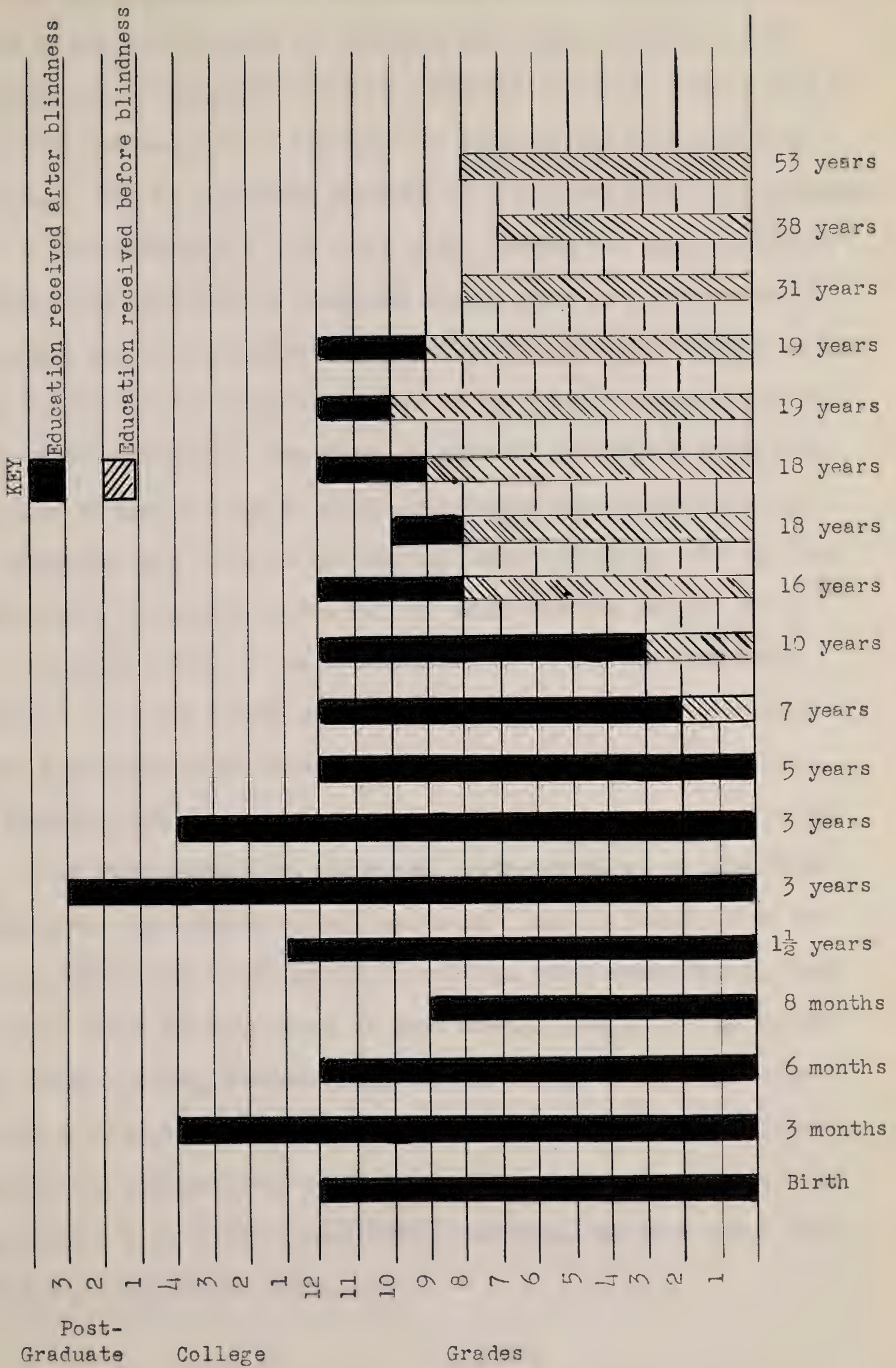
In analyzing data relative to educational background, a significant relationship was discovered between education and the age at which blindness occurred: those who lost their sight before or during the normal school age received a higher education than those who had sight during those years. The following chart reveals the educational status of each worker and relates it to the age at which blindness occurred.





Chart 1

COMPARISON OF AMOUNT OF EDUCATION RECEIVED  
WITH AGE AT WHICH BLINDNESS OCCURRED







The chart shows that the nine persons who lost their sight before ten years of age are the ones who received the highest education. As illustrated, all of these nine persons graduated from high school. One of the nine finished one year of college, and three of the nine graduated from college. One of the latter obtained an LL.B. degree after post graduate work. The five persons who lost their sight between the ages of fifteen and nineteen had completed at least the eighth grade in a sighted public school before losing their sight. These five resumed their studies at the Missouri School for the Blind where four of the group graduated, and one completed the tenth grade. The three persons who lost their sight after twenty years of age, the age at which most people have completed their formal schooling, are the ones who had the least education. Two of this group completed the eighth grade, and one completed the seventh grade.

The chart points up the ironic fact that those who lost their sight before or during normal school age received a higher education than those who lost their sight after the age of twenty. A study of educational opportunities shows that these opportunities were provided by the state. It is unrealistic that the state, having provided so many years of training for the blind of school age should fail to qualify them for jobs commensurate with those years of training. On leaving school, most of them must shift for themselves in such sterile occupations as broom-making, basket weaving, chair-caning, and are forced to eke out their poor wages with small pensions. Surely, with so many years for training, it is worth the comparatively small extra effort necessary to give these blind persons a more valuable vocational education, one that would place them in truly remunerative employment.





### Vocational Training

The reason for including vocational information in the study was to determine whether the blind worker had received training or experience in mechanical skills that would particularly prepare him for industrial employment. Results indicate that only one of the workers had received training that was a preparation for the job he now holds, and this training was received before the worker became blind. Six others had received vocational training in such fields as massage, dictaphone operation, typing, broom-making, probate law and music - fields obviously unrelated to their present jobs. All of the workers had received the regular vocational training offered by the Missouri School for the Blind. However, the school prepared them only for trades traditionally open to the blind, such as piano-tuning, chair-caning, handicrafts, broom-making, typing, etc.

These blind workers apparently were not handicapped on their jobs by the lack of specific training. Their tasks involved certain simple mechanical operations that could easily be performed without specialized, vocational training. The jobs were taught by the supervisor in the plant to both sighted and blind workers alike, and generally took only a few minutes to learn. None of the eight supervisors felt that special training was required for the performance of these jobs.

It is clear, therefore, that in this instance the blind were not handicapped by lack of vocational training. But this does not ignore the point that they might have acquired better jobs if they had received different training. The inadequacy of vocational training contrasts sharply with the general adequacy of educational background. Coincidental with providing a broader and more realistic vocational training, a campaign should be conducted to sweep away the prejudices that bar





employment of trained blind workers.

### Previous Employment

This information, like that on vocational training, was obtained to see if the blind workers had received any experience in industry before starting wartime employment at the Mines Equipment Company. Only those jobs which workers held after losing their sight were considered. Results show that while four workers had been employed in industry, none had received prolonged industrial experience. Most had held jobs in the fields traditionally open to the blind. The following table will show the types of jobs workers were engaged in.

It is apparent that this table shows more jobs than workers. This is accounted for by the fact that one worker may have been engaged in several jobs before his employment with Mines Equipment Company. For instance, one worker at various times operated a refreshment stand, was employed on a W.P.A. project, Braille proof reading, worked for an industrial concern tying ropes, and was an independent salesman, selling brooms, mops and small articles. Therefore, the four types of work performed by this worker are all listed separately in the table.

One important fact revealed by this table is that the largest number of jobs fell under the Sheltered Workshop and W.P.A. projects, work that was subsidized. Each of these two types of work was represented by seven workers. The occupations listed in each had been traditionally accepted as fitted for blind workers. It is also significant that the next highest number fell under the classification of private business, selling, and the professions, occupations that for the most part called for self-employment and self-financing.





Table 3

OCCUPATIONS ENGAGED IN PRIOR TO EMPLOYMENT  
WITH THE MINES EQUIPMENT COMPANY

Type of Work	Number of Workers	Total
Total number of different jobs performed		48
A. Private Business		
1. Operated service station	1	
2. Tuned pianos	1	
3. Raised poultry	1	
4. Operated stand	1	
5. Operated handcraft shop	1	
6. Taught music	1	6
B. Selling		
1. Door-to-door selling	4	
2. Salesman for printing company	1	
3. Salesman for music instrument company	1	6
C. Sheltered Workshop		
1. Sewing	2	
2. Supervising	1	
3. Making brooms	2	
4. Selling	2	7
D. Home Industry		
1. Sewing	2	
2. Chair caning	1	3
E. W.P.A. Project		
1. Braille proof reading	4	
2. Braille transcribing	1	
3. Home teaching	1	
4. Teaching	1	7
F. Professional and Semi-professional		
1. Lawyer	1	
2. Teacher	2	
3. Radio broadcaster	1	
4. Masseuse	2	6
G. Industry		
1. Rope splicer	1	
2. Inspector	1	
3. Rag cleaner	1	
4. Rope tier	1	4





Table 3 - Continued

Type of Work	Number of Workers	Total
H. Stenography		
1. Dictaphone operator	1	
2. Typist	1	2
I. Operator of State Stands	2	2
J. Unclassified		
1. Radio mechanic	1	
2. Musician	2	3
K. Unemployed	2	2

Stenography and State operated stands contained the lowest number of jobs performed with two in each classification.

Two workers after they became blind were not engaged in any type of employment prior to securing a job with the Mines Equipment Company. These two workers lost their sight in adult life, one at the age of thirty and the other at the age of fifty-three. The third worker who lost his sight in adult life was intermittently engaged in selling printed material as a representative of a printing company. This unsteady job was the only type of work this person was engaged in throughout the thirteen years that elapsed after blindness set in until his employment with the Mines Equipment Company. It is again significant that prior to the time these three workers lost their sight, they were steadily employed.

Of the four jobs held in industry, all were obtained after the beginning of the war emergency and the consequent labor shortage.





## CHAPTER III

## JOBS PERFORMED

In order to give a comprehensive presentation of all types of work performed by blind workers at this plant, the jobs have been divided into two groups: (1) jobs engaged in during the three month period covered by the study, extending from April through June, 1944;<sup>1</sup> and (2) other jobs which have been performed at Mines Equipment Company previous to this period.

The numerous operations performed by the blind have been classified according to functions under eight headings. Five of these are types of jobs currently engaged in and include Inspection, Assembly, Machine Operations, Repair and Maintenance, and Supervision. The other three are types of jobs performed at an earlier period and include Packing, Clerical, and Odd Jobs.<sup>2</sup>

This chapter will also include a discussion of how these blind workers were enabled to learn the operations involved in these jobs.<sup>3</sup>

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<sup>1</sup>It is possible that a study covering a longer period of time would have revealed a larger range of jobs, since workers were constantly being shifted from one job to another.

<sup>2</sup>See Appendix F for list of operations included under each job classification.

<sup>3</sup>The term job as used in this study signifies a certain class of operations. For example, Inspection is a job, including many specific operations, such as testing with go-and-no-go-gauge or checking holes in caps. On the other hand, operation signifies each of the particular operations performed in an over-all job.





Before discussing the particular jobs performed by these workers, the reader should have some information about the type of production carried on by the Mines Equipment Company and how blind workers came to be employed in this plant. An understanding of what this Company is and what it produces will give the reader perspective, enabling him to fit the particular job of the blind worker into the total production scheme of the plant.

As indicated by its name, the Mines Equipment Company originally produced equipment for mines, such as miner's lamps, electric cables, communication wires, and other specialized mining equipment. However, at the outbreak of the war, it was found that their organization could be used in manufacturing special articles for our troops, such as communication cables, electrical equipment and specialized lighting devices. By June, 1944, the Company had increased in size from one plant employing 150 workers to two plants employing 1,500 workers.

In January of 1943, James Miller, Production Manager of Mines Equipment Company was faced with the problem of an ever dwindling supply of labor. Workers were becoming increasingly scarce because of the unprecedented demands for manpower in war industries and in the Armed Forces. Some of the workers he had recruited were inefficient, thereby cutting down production in their departments. For instance, four women who were engaged in stringing small insulation beads on wires of fixed lengths, were extremely inefficient from the standpoint of both accuracy and speed. One day, Miller, while idly fingering the insulation beads in his pocket was suddenly struck with the idea of using blind workers for this job. He took his idea to Harold Williams, Vocational Director of the Missouri School for the Blind, to ask his advice. Williams thought





the blind could do the job, and two blind workers were assigned to the plant on trial. In a short time, these two blind workers had doubled the output of the four sighted women. Furthermore, they were steady on the job and conscientious about their work.

From this one simple operation they moved to other tasks, such as staking eyelets with an eyelet machine, tying various kinds of knots in string, and cutting wire to specified lengths. As they demonstrated their ability on each successive job, the skepticism began to fade and supervisors assigned them to more difficult jobs. Miller was impressed by the success of his experiment. He began soon after to hire other blind workers. To illustrate the way in which the number of blind workers increased from the original two to the present total of the eighteen now employed, Mr. Miller had this to say:

After the first experience, another opening occurred at the plant. This resulted from the fact that I wasn't allowed to buy a counting scale. We again sent for some blind persons, and that's the way it went. Now we have eighteen workers. Some of the jobs they are doing are: assembling, gauging, counting, wrapping, sorting, packing, stringing wires, etc.<sup>4</sup>

As demonstrated, workers proceeded from simple jobs into more and more difficult ones. This variety of jobs was brought about in three different ways: first, the distribution of blind workers throughout the two plants, which provided them with an opportunity to perform a greater variety of operations than would be possible if they were isolated in one department; second, job opportunities were broadened by constantly changing conditions within the plant, such as new government contracts which

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<sup>4</sup>"Minutes of the Meeting for Promotion of the Blind in Industry," April 16, 1943.





called for new operations hitherto not engaged in by workers in the plant; and third, quickly changing war needs called for sudden shifting of workers to the departments producing the most urgently needed products.

As to the first point, distribution of the blind workers throughout the two plants, in six different departments, the Mines Equipment Company is following in practice the theory of distribution of blind workers in industrial plants subscribed to by such agencies as the National Society for the Blind and the Federal Security Agency's Division of Services for the Blind.<sup>5</sup> Under these conditions, the number of workers in each department varied, depending on the need at any one time for their services. At the time this study was undertaken, it was discovered that the number in each department varied from six workers in the Inspection Department (although eight workers are doing inspection work), where the greatest concentration exists, to one worker in each of five other separate departments, including all three time shifts. One of the reasons for the preponderance of workers in the Inspection Department is that the demand happened to be pressing for inspection jobs at this time. But a more important reason is that it was found that blind workers were

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<sup>5</sup>Three important advantages of wide distribution of blind workers in a plant are listed. (1) Economic Advantage: It is preferable to have one or two blind persons performing a particular type of work than a group because if the job should terminate only a few will be laid off. An example of bad placement is in North American Aviation Plant in Dallas, Texas, where a group of fifty workers are all performing the same operation. When this work is no longer needed, all fifty will be discharged. (2) Social Advantage: First, one or two blind persons are less of a personal care than a group would be, and second, companionship is made more likely with sighted individuals, than if blind workers were segregated from others in one department. The association of the blind with the sighted will help to eradicate some of the fears and prejudices of the sighted about the blind. (3) Educational Advantage: The spread of the blind throughout the plant will help to educate the employer into realizing that the blind is capable of a variety of allotted tasks, and will increase his chance of being accepted on an equal status with sighted workers.





particularly adept at inspection jobs which require a refined sense of touch. Blind workers were more suitable for the performance of such jobs than sighted workers.

### Inspection

The six blind workers in the Inspection Department inspect the component parts of lighting equipment which is being sent to the Armed Forces. This inspection consists of a variety of operations, as each part of the lighting equipment must be examined. Furthermore, new parts are constantly being introduced as research and experience suggest new improvements. The process of inspection is usually the same for all parts, that is, parts are inspected with "go" and "no-go" gauges. These gauges measure the article inspected for accuracy of size. For example, the part inspected is placed on the "go" gauge. If the article fits perfectly, then it may be satisfactory. However, since the slightest variation in size must be avoided, the article is checked with a "no-go" gauge. The article should not be able to fit over this gauge. If it does, then the article is discarded. These gauges are of two types, threaded and smooth. The threaded gauges take care of all articles that have threading, such as screw-in plugs, while the smooth gauge takes care of smooth articles without threading. However, other simpler inspection operations are engaged in.

Blind workers are engaged in eight types of inspection in the Inspection Department, each of which involves a number of operations. In addition, two blind workers are engaged in three inspection operations outside the Inspection Department. The total eleven inspection jobs performed by the eight blind inspectors, and the operations entailed under





each job are as follows:

1. Checking tubes
  - a. Testing with go and no-go gauges
  - b. Checking depth of ball
  - c. Checking total depth of tube
2. Inspecting caps
  - a. Checking diameter
  - b. Checking holes in cap
  - c. Assembling springs in caps — inspecting before assembling
3. Inspecting bolts
  - a. Tapping thumbnuts
  - b. Assembling nut to eyebolt
  - c. Testing nut on bolt for tightness
4. Inspecting cover (has same function as cap)
  - a. Checking diameter with go and no-go gauge
  - b. Checking holes in cover
  - c. Testing for slots on side
  - d. Assembling springs in cover
5. Testing switches
  - a. Testing for thread to fit the contact with go and no-go gauge
6. Testing miniature lamps
  - a. Gauging for size, depth of lamp base with go and no-go thread gauge
  - b. Testing in socket
  - c. Testing for looseness of glass in base
7. Gauging threads on collars and rings
8. Gauging threads on studs and screws
9. Inspection of sockets for size with a smooth go and no-go gauge
10. Inspection of pins for length and diameter with a "snap" gauge
11. Checking connector with wall plug gauge (go and no-go gauge).





It will be noted that there are twenty-five operations involved in the various types of inspection work. However, not all of these operations are necessarily performed during a single day. Although two workers do the same type of inspection operation every day, and others may, on a rush job, be forced to inspect one article exclusively during a day, this does not frequently occur because the work then becomes so monotonous. Generally, the inspection is varied to include several types of inspection during the period of one day.

Blind workers in this plant are performing every inspection operation performed by sighted workers except for two operations which are excluded because sight is essential for their performance. These are (1) inspecting miniature lamps for brilliancy, and (2) inspecting reflectors. The small area of operation involved in inspection jobs makes them particularly suited for blind workers. Inspection workers are usually seated around a table with the result that their jobs are performed in a limited area. There is no need for the worker to move about. Ready examination by the fingers is facilitated by the medium size of articles which vary from small screws to flash-light cases, two inches in diameter and ten inches in length.

#### Machine Jobs

The machine jobs involve two general categories of operations: (1) operating mold presses, and (2) operating drill press and tapping machines.

Five workers operate mold presses. A mold press is a large machine about six feet high, with a wheel-like mechanism at the top for opening and closing the mold. The mold is operated at a temperature of





about 300 degrees Fahrenheit to vulcanize the rubber wrapped around connectors which are placed in the mold for short periods in order to bake the rubber. A bell arrangement operated by a clock is the signal to remove the connector from the mold. The main duty of the vulcanizing pressman is to raise and lower the molds by aid of the wheel-like lever. An additional part of this operation is the removal of the excess rubber that comes from the hot press. The work of wrapping the connectors and placing them in the molds is usually done by sighted workers, but occasionally blind workers have performed this more difficult operation. The number of presses a worker can handle depends on the time required to cook the rubber, and that time varies with the different presses. Some presses require twenty minutes for the cooking job, others ten. Therefore, one might expect a worker operating a ten minute press to be twice as busy as one operating a twenty minute press, but the man with the slower presses is given double the number to operate.

Precision and good work organization are required of the vulcanizing pressman if connectors are not to be overbaked and spoiled. It is equally important that the sighted worker who wraps the raw rubber around the connectors should follow a rather strict schedule. The connectors must be placed in the press machine at staggered intervals. If the work is not properly spaced, it will result in the necessity of removing connectors from several machines at the same time. In such instances, the vulcanizing pressmen must rush to remove connectors to prevent their being overcooked.

The work of drill press and tapping machine is closely related. The operator drills holes in yokes (small U-shaped pieces of metal about two inches in length and three fourths of an inch in width, used in





connectors) on a small drill press, then the tapping machine threads the hole for a screw. Both machines are placed on a table before the worker. Organization of work has much to do with the output from these two machines, as will be shown in the next chapter.

At the time of this study, only one operator, a blind worker, was working full time on the two machines. His assignment to that job exclusively was due doubtless to his skill. His supervisor stated: "He is the fastest operator we have ever had on the job." Four other blind workers have operated these machines in the past and occasionally operate them at the present in addition to their other duties.

While these machine jobs are the only ones in which workers are regularly engaged from day to day, there are part-time machine operations involved in other jobs. As an example, four inspection workers do tapping operations on thumbnuts after they have been inspected. Again, in assembly operations, nuts are screwed in bolts, and a machine is used to flatten out the top of the bolt to form a head on a screw (known as staking). The operation of the two machine jobs does not require the worker to move beyond one location. Like inspection jobs, it is in this respect particularly suited for blind workers.

### Assembly

The two workers presently engaged in assembly are located in two different departments, each one being the only blind worker in his department. The reason there are so few assembly workers at present is that a temporary lull existed in this type of operation, the demand having increased for other jobs. Their work consists of bench assembly of small parts. Some of the operations involved are: (1) ringing brass, (2) tubing





brass, (3) assembling rheostats, and (4) assembling lead cables. Ringing brass on connectors comprises three separate operations. The connector is made up of several parts, one being a flat brass strip which serves as the base. The operator must place on one half of the base five pins two inches high, arranging them in a semi-circle. On the other half of the base he sets five hollow tubes. Then he must push springs and rings over each pin. Lastly, he must pull them together in position with a hand-operated machine.

Tubing brass on connectors is a simpler operation. Hollow tubes of the diameter of an ordinary pencil, previously soaked in naphtha, are arranged in a semi-circle covering one half of a brass base. The tubes must be fitted by hand to pins placed on the opposite half of the connector. These pins have already been fitted with rings and springs. The assembling of rheostats involves the winding of wire around a soft iron rod, which forms a core and attaches a sliding contact on the rod. Assembling lead cables comprises such operations as pushing spring on end of cable; putting cover on spring; putting spring cable through cover (part then sent to be soldered and painted); putting switch in small hole in cover; putting on lock washer; and then putting on bolt.

It should be pointed out that two of the jobs performed in the Inspection Department are assembly operations, inasmuch as articles are inspected and assembled at the same time. These two jobs are: (1) inspection of rings to be inserted in caps, and then inserting the springs; and (2) inspecting nuts and bolts for size by screwing nuts on bolts.

One supervisor remarked that assembly work is particularly satisfying to the worker because he feels a sense of accomplishment in





putting parts together to make a finished article. "The blind worker will feel more satisfaction on assembly than on routine work in which he never sees the finished product. In assembly work he will see at least a finished part and feel a greater satisfaction in having accomplished something." His remark is well supported by comments of several blind workers, of which the following is typical: "It is gratifying to take parts which alone have no meaning, and put them together to produce a useful product." The supervisor plans to place more blind workers on assembly jobs in the future, as he anticipates a greater demand for this type of work.

### Supervision

One blind worker is the supervisor of a stock room in a department of nearly 500 workers. His job entails a considerable amount of responsibility. Ordinarily he has two workers under him, a helper and a secretary, but he calls in additional workers when he needs them. It is his responsibility to keep a supply of stock for current and future needs, and to dispense this stock to employees of his department. He keeps a close check on about 200 separate items.

He has developed a well-organized system of handling materials. He places them on shelves in chronological order, each part has an identifying number, and keeps a fixed amount of material always on hand. Because of what his foreman calls "a phenomenal memory," this worker knows all items kept in the stock room and where they are. At any time he can go directly to the article wanted. Records are kept by his secretary under his direction. Records on materials and supplies which he must make available at all times consist of five kinds of information:





(1) date when packed; (2) who packed; (3) name of part; (4) number of pieces; and (5) name of manufacturer. In addition to arranging the physical layout of the stock room, this worker must make out reports in duplicate which are sent to Cost, Purchasing, and Production Departments. His work must also be coordinated in some respects with that of other departments. He must decide which items shall be given out without a requisition, and it is his duty to seek out all defective parts and make recommendations to the foreman for disposal of these parts. In addition he performs much of the manual labor in his department, such as operating a hydraulic lift which raises the heavier boxes to their position on the shelves.

The stock is so arranged that the oldest parts on hand are used first. It is not necessary to look at the date, as stock is put away so that if moved out from bottom up, the oldest part is given out first. This worker also simplified inventory procedures. For instance, when he first took over the stock room, parts were delivered to him in boxes of various sizes. He simplified his inventory problem by putting all parts in standard sized containers, each one of which was known to contain a specified number of parts. Now, to estimate the quantity of parts, it is only necessary to count the number of boxes.

This worker has also discovered a way to keep employees in line, so that they will not grow careless about drawing more tools or supplies than they need. Often an employee would misplace a tool, and rather than exert himself to find it, would ask for a new tool. By arranging for the worker to sign for the article on slips of paper, which the supervisor filed away, he was able to bring pressure to bear upon the individuals who grew careless.





It is interesting to note that this worker advanced with his job. As the size of the plant increased, the duties of the stock room supervisor became more and more a full-time job. He was the first to be placed in full charge of this room, and was later given helpers. When asked how he was able to keep track of the various parts and numbers by memory, he said,

It has always been my idea to absorb all the information that came my way, so when I heard numbers called I made a mental note of them. Then, whenever the opportunity offered, I would find out what part the number belonged to. After a while, people began to realize I knew them, and did not feel it necessary to check on me.

### Maintenance and Repair

One blind worker is in charge during the swing shift, three to eleven p.m., of the maintenance and repair of equipment used on the assembly line of his department. A sighted worker is in charge of the same job on the day shift. This job calls for ingenuity since he not only must decide just what must be done, but must find out how it can be done. Although he gives directions to men working with him, he also does repair work himself. This worker is the only blind worker who has held this type of job in the plant.

His work consists of: (1) repairing five different types of soldering irons - cleaning, shaping, replacing heating elements, cords, etc.; (2) repairing electrical outlet boxes; (3) adjusting machines and setting them up for workers, which includes placing jigs for proper depth; (4) repairing machines; and (5) keeping tools cleaned and oiled. These are the jobs he does routinely at present. However, new types of repair work are always coming up.

This job requires ingenuity and initiative on the part of the





worker as no two jobs are exactly alike. Each repair job calls for diagnosis and its own special kind of treatment. The worker has not only shown ingenuity in repair work, but has shown unusual inventiveness in devising new methods. He discovered that the use of chloride of ammonia in cleaning soldering irons was superior to the chemical generally used in the plant. He also suggested that soldering irons be placed in brackets with the tip pointed down, in order to slow down corrosion.

### Packing

Two workers are engaged in packing in addition to their regular jobs. Generally, these packing operations consist of: (1) making small boxes or packing individual articles; (2) packing each separate article in these boxes; (3) packing these smaller boxes into larger boxes for shipping; (4) packaging other small articles in waterproof bags and stapling or sealing them; and (5) then packing waterproofed packages into larger boxes.

A number of other operations may be involved, depending on the type of product which is being packed. For instance, before packing rubber and metal insulation sleeves, it is necessary to count them into specified lots. Also included under the packing classification are such jobs as labeling boxes, taping them, and stamping identification tags for them. In stamping tags a small ink hand-press is used. The tags have several lines on them, the first part of the line being already printed, leaving the remainder blank for the printing of further information. A blind worker has achieved remarkable accuracy in placing information squarely on the line. He does this by using the hole at the end of the card as a guide, and gauging the distance for printing from





this hole.

According to his supervisor, this worker is even more accurate than sighted workers, an ironical fact inasmuch as this job was considered a visual operation. This is but one of several instances discovered in this plant of the many ways ingenious blind workers overcome their handicap. Another packing job is an electrical sealing operation. The electric sealer is a mechanism of electrically heated bricks between which openings of bags, impregnated with a resin compound, are placed. The bricks are then pressed together by means of a foot lever and the heat seals the bag, making it waterproof.

### Clerical

One blind worker assisted the supervisor in the Spare Parts Department by taking inventory of stock, giving out stock to workers, and assembling materials for workers. Her work was facilitated by the fact that all stock was lined up systematically along the walls, ranging in order from small to large parts. She knew, therefore, exactly where to go for her materials. A sighted girl also working in this department gave assistance whenever needed.

### Odd Jobs

This category of jobs consists of a miscellaneous group of operations which were performed as fill-in jobs either when work at a regular job was declining or when demand for some particular article was unusually great. Most of these jobs involved such operations as cutting cables, wires, and string to certain specified lengths. To assist the blind workers in gauging the exact length, a notch was cut in a table at





the desired distance from the reeling machine. Most of these jobs are the kinds first assigned to workers after their employment at the Mines Equipment Company.

### Method of Learning Job

An examination of the way blind workers learned their jobs reveals that they received their training in much the same way as sighted workers received theirs. The only difference, apparently, was that blind workers had to learn by feeling the articles or machines they were to work with. No formal course of training is considered necessary by management for workers below the rank of foreman. As one worker pointed out, "on unskilled jobs engaged in at present no special course of training is required. All that is needed to learn them is manual dexterity and intelligence." Supervisors give individual instruction to workers on each new job assigned them. First, the supervisors give a careful description of materials used and then proceed to explain the principles involved in each manual or mechanical operation. Supervisors discovered in a short time that workers learn a job easier if the purpose of the job is explained, allowing the worker to devise his own methods about the job rather than the supervisor insisting on doing work in a certain way. One worker remarked, "the supervisor tells me what he wants done; shows me his way; and then tells me to do it the way I want to." When difficulties are encountered, or mistakes made, the supervisor comes around to give additional instruction.

However, supervisors vary in their teaching ability, with the result that some workers had difficulty in learning their job. In one instance, a worker observed that a co-worker was having difficulty in

The first part of the paper discusses the importance of the  
second part of the paper discusses the importance of the  
third part of the paper discusses the importance of the  
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fifth part of the paper discusses the importance of the  
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seventh part of the paper discusses the importance of the  
eighth part of the paper discusses the importance of the  
ninth part of the paper discusses the importance of the  
tenth part of the paper discusses the importance of the



learning a job. "I want over to teach him. The supervisor should get over the idea of the purpose of the operation, and leave the individual to devise his own method to get results." Another worker said, "I found it difficult to learn because supervisors were not always clear about the work. I sometimes asked twenty questions before I got a complete answer." An unsympathetic foreman or supervisor may fail to explain everything involved in an operation or fail to anticipate all the difficulties likely to be encountered. In the case of the blind worker, the need is all the greater for an intelligent supervisor who understands what the blind need to know, and tries to put himself in their place to see what difficulties they are faced with. The lack of these qualities in some supervisors forced workers to seek instruction elsewhere. They would learn from questioning other workers performing the job to which they were assigned. In some cases, fellow blind workers, who understood their problem, would teach them.

This lack of adequate teaching ability among some supervisors might have restricted the blind workers to a few operations if the more enterprising among them had not taken the initiative in learning new jobs. These curious workers would ask questions about untried jobs and then try them out. When the supervisors discovered they could perform them, the blind workers were allowed to carry on the new work.

However, after some experience with the blind, many of the supervisors learned the special problems involved in teaching them. These supervisors then became enthusiastic over how quickly a blind worker can be taught. As one remarked,

Some sighted workers are more difficult to teach because they do not seem to grasp the idea of what they are being taught, whereas blind workers, by contrast, are very quick





to grasp the idea (. . . .) the blind worker is usually more concerned with the ideas and principles back of an operation than a sighted worker.

One foreman gets good results because his explanations are clear and easily comprehended by the worker. Out of his experience with blind workers, he developed a code that might well be followed by other supervisors. It is worth quoting here:

The supervisor must analyze the job and put himself in the place of the blind worker (. . . .). He must know the job well to teach it, and he must understand the worker, and his aptitudes and interests (. . . .). The supervisor must not take too much for granted, but explain each step of the operation as well as the materials used, and the purpose of the operation.

It is interesting to note here that this foreman and several other supervisors observed that the blind worker was not so easily distracted as the sighted worker. As one supervisor said, "They seem to concentrate better (. . . .). They don't seem to be so easily distracted, as they can only observe what they have in their hands." This corresponds to the statement made by Enid Griffes, an official of the American Foundation for the Blind. She says,

The blind have greater powers of concentration. This is due partly to the absence of temptation in the form of visual distractions, and partly to their need for focusing full attention on the operation in hand since the sense of touch must be substituted for the sense of sight.<sup>6</sup>

The supervisors commented that blind persons seem to live more in a world of ideas. These supervisors, from practical experience with the blind, were observing a phenomenon formerly noted by an eminent blind psychologist, Dr. Thomas D. Cutsforth, who says, "The blind individual,

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<sup>6</sup>Enid Griffes, "The Blind Can Do It Better," Harper's Magazine, April, 1943, p. 522.

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by necessity, becomes less objective, for a large amount of objective stimulation is physically excluded. There results a turn of the mind inward."<sup>7</sup>

As to the time required to learn a job, that mostly depended as in the case of sighted workers, on the type of job and the individual learning the job. One blind worker said, "It takes us no longer to learn the job than sighted workers, because of the simplicity of the work." Another worker commented, "Most jobs I have learned more quickly than the sighted." The comments of supervisors bore out these statements. One supervisor said, "In comparing them with sighted workers, they were more eager and learned more quickly." Generally, the jobs were learned in a few minutes, although it often took several days for the worker to reach a maximum rate of production. As pointed out above, lack of adequate instruction can prolong the period it takes for the worker to learn his job. Also, lack of confidence or fear may delay a worker in learning his work.

### Summary

Mines Equipment Company began employing blind workers because of wartime labor shortages. The experiment, begun by James Miller, Production Manager of Mines Equipment Company, in cooperation with Harold Williams, Vocational Director of the Missouri School for the Blind, proved so successful that as openings appeared for which blind workers were qualified, more and more blind workers were engaged until the maximum of eighteen employed at the time of this study, were at work on

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<sup>7</sup>Thomas P. Outsworth, The Blind in School and Society (1935), p. 97.





numerous operations.

At no time were the blind segregated from the sighted workers; rather, the number of workers in each department varied, depending on the need at any one time for their services. At the time this study was undertaken, blind workers were engaged in Inspection, Operation of Machines, Assembly, Supervision, and Repair and Maintenance. Previously, in addition to the five classifications aforementioned, workers had been engaged in Packing, Clerical, and Odd Jobs.

Except for the fact that blind workers had to learn their jobs by feeling the articles or machines with which they had to work, their training varied little from the instruction given sighted workers. Obviously, the speed with which a blind worker acquired the skill requisite for efficient performance of his assigned task was proportionate to the teaching ability of the supervisor; that is, the degree of clarity in the explanations and demonstrations given by the supervisor, (in explaining a certain job to the worker). As supervisors began to realize the special problems involved in teaching the blind, they discovered with enthusiasm the quick perception of the blind worker in grasping the gist of their instructions. They found, too, that a great advantage in assigning blind workers to various tasks was the fact that such workers, free from visual distractions, seemed to concentrate more intensively on the job at hand.

It soon became evident that the length of time required for blind workers to learn the fundamentals of their jobs compared favorably, and in some cases exceeded, the speed with which sighted workers absorbed the same instruction. With blind and sighted worker alike, much depended on the type of job and the individual learning the job.





## CHAPTER IV

## EVALUATION OF PERFORMANCE

Quantity and Quality of Production

In obtaining an evaluation of the performance of blind workers, emphasis was placed on the quantity and quality of their work output, inasmuch as this was the basis on which they were hired. As the production manager pointed out, "These blind workers were hired with the understanding that they were expected to produce as much and as well as the sighted worker. I did not hire them out of charity or as a philanthropic enterprise."

In order to get a complete and balanced appraisal of these two factors, the study obtained two points of view. First was that of management. This represented the views of the time-motion engineer, department supervisors, and the production manager. The second was that of the worker. Since no regular records were kept of all the workers performance at the Mines Equipment Company, and since there were no set quotas workers had to meet, it was decided that this subjective approach would be necessary.

It is recognized that a statistical comparison of the blind and sighted worker's output would have been desirable. However, no records were available other than those occasionally made by the time-motion engineer, comparing the average output per hour of blind and sighted workers performing the same operation. The time-motion studies were undertaken to estimate an average production rate, and workers were





expected to keep their output up to this average. These studies were made only on particular jobs, and as jobs fluctuated from time to time, the comparisons supplied by the studies can be used here only to corroborate the overall views of workers and management on productive output.

The primary reason controlled comparisons were difficult to make was that the plant had no general quota which workers were required to meet. In some departments the setting up of a quota would have been impossible, because of unfortunate variations in inspection standards.<sup>1</sup> For instance, there is often a variation of opinion between foremen and government inspectors as to the standard an article should measure up to. In addition, the government recommends changes after equipment has been tried in the field, with the result that standards are always fluctuating. Sometimes this change in standards is made in the middle of an inspection operation. A whole shipment of articles may be rejected because of the failure to notify workers of the change. Obviously this makes it difficult for a worker to produce a definite quota of articles acceptable for shipment within a specified period of time.

The production quotas that exist are set up for the plant as a whole. They are usually set up once a month, based on changing government orders. Production is often rushed because of the urgency of the Army's needs, and workers must speed up their output correspondingly. Sometimes, when production is held up by delays in receiving parts from other factories, it has to be speeded up correspondingly later on to get material out on time. One worker tells a dramatic story about such an

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<sup>1</sup>Standards were set up by Ordnance Department and Government inspectors were employed full time to make certain that articles met standards.





## Incident.

During the spring rains last year, transportation was held up for three weeks. This caused a serious delay in our shipment of parts to the fighting zones. When the much delayed material finally arrived, our foreman came to us with these words, "Gang, we are three weeks late in our shipment. I would appreciate it if you would pack rubber as you never did before." We really swung into action. We did the packing so fast that while one truck was unloading rubber parts, another truck was being loaded with the finished article.

The same worker explained that on this job there were six workers at a table -- three blind and three sighted. The average packing rate was 5,000 rolls in four hours. But on this rush order, the workers packed 5,000 rolls every two hours and nine minutes, maintaining this speed until the order was completed. At other times, however, the workers may be only reasonably busy. The important point is that workers always met the quotas set from time to time by the Army for war materials.

The use of the subjective approach in appraising the performance of blind workers was not without its merits. It uncovered significant data that could not have been revealed in a statistical chart alone. Furthermore, this reliability was strengthened by the consistency of the reports received from management, workers, and statistical records.

All three types of evidence, nevertheless, indicated the unusual abilities of the blind. The writer had long believed in these abilities because of her close contact with the blind and study of their problems. However, she lacked scientific evidence and undertook this study to determine whether her beliefs were colored by prejudice or could actually be established by an impartial and objective study. Results indicated that capable blind persons could compete successfully on an equal basis with the sighted, provided certain restrictions arising out of their handicap were taken into consideration.





In presenting this evidence regarding the quantity and quality of production, it was deemed advisable to break it down into eight parts according to job classifications mentioned in Chapter III. Under each of these classifications the viewpoint of workers and that of management will be considered, to be followed by whatever statistical evidence is available.

### Assembly

All the workers in this job classification felt that their production was as high as that of sighted workers and in many instances superior. One worker said that he was able to achieve a higher rate in assembling springs into caps than any sighted worker had ever achieved. In one day he put out 2,270 in eight hours. Sighted workers' average was 1,200. Also, in box-making, he surpassed the fastest sighted box-maker. Another worker said that in assembling receptacles, he had kept pace with sighted workers. One worker, engaged in tying cables said, "I can put out as many as the sighted and do them neatly and firmly." Another one said, "Put me on a job with a sighted worker and at the end of the day I'll have put out more work than he will." In the tubing and ringing brass operation, a worker said, "I believe my work measures up to the expectation of the plant..in many cases I think it above standard." Also, in stringing beads, workers said they felt they were assembling more than sighted workers. Actually, they had doubled the output.

The viewpoint of management bore out the testimony of the workers. Supervisors all agreed that blind workers produced as much work, of as high a quality, as sighted workers produced on assembly jobs. In many cases, they said, blind workers were producing more than sighted workers.





For instance, the production manager said that blind workers could string beads much faster than any sighted worker. A foreman said, "Blind workers have done the assembly jobs very successfully. You don't have to show them more than once. They are even faster than sighted workers on such operations." He said: "There is not so much to distract their attention; they concentrate on their work, and catch more mistakes than sighted workers do."

Statistical comparisons made on a few workers provided scientific proof of these assertions. For instance, in April, 1943, ten blind workers were assigned to the job of assembling springs in caps. The sighted workers' best hourly average on this job was 150. Blind workers were able to produce an average of 262 hourly. The following record of comparisons, made on different dates, reveals the efficiency of two blind workers on this job. All tests covered the period from August, 1943 through June, 1944.

Table 4

COMPARISON OF AVERAGE RATE PER HOUR OF BLIND AND SIGHTED  
WORKERS IN ASSEMBLING SPRINGS TO CAPS<sup>a</sup>

Worker	Date	Average per Hour
Blind Worker A	August 19, 1943	220
Blind Worker A	February 19, 1944	177
Blind Worker A	April 10, 1944	261
Blind Worker A	April 10, 1944	232
Blind Worker B	April 10, 1944	282
Blind Worker B	April 11, 1944	232
Blind Worker B	June 7, 1944	225
Blind Worker B	August 13, 1944	231
Sighted Worker	May 9, 1944	65
Sighted Worker	August 28, 1944	150
Sighted Worker	February 19, 1944	109

<sup>a</sup>All the tables presented in this chapter will be a comparison of the rate of output of blind workers with that of sighted workers. The comparison of these two groups will be assumed in the titles of the following tables.





These tests were based on average rate per hour for a full eight hour day.

On another assembly operation, Assembling Eyelet to Contact, which is affected by putting eyelet in place by hand, and forcing it in with chisel, blind workers again demonstrated their competency.

Table 5

## ASSEMBLING EYELET TO CONTACT

Worker	Date	Average per Hour
Blind Worker C	August 20, 1943	259
Blind Worker C	August 23, 1943	233
Sighted Worker	September 12, 1943	252
Sighted Worker	September 14, 1943	122
Sighted Worker	October 8, 1943	200
Blind Worker C	April 14, 1944	181

Inspection

Most of the workers in this job classification felt that their work was superior to that of sighted workers. One worker said, "On the inspection of miniature lamps, I think our record is a little better than that of the sighted. We have better organization in this type of work." Another worker on the same job commented, "Our rate of error is very low. I don't know whether this is due to the sighted worker's inaccuracy or to lack of definite standards." Both of these workers pointed out that rejections on miniature lamps had been greatly reduced since they took over the job. A worker who inspects sockets and pins said that he had had no complaints from the supervisor so he felt his





work was satisfactory. His present output on socket inspection, he said, was 8,000 to 9,000 per day, an increase from the 4,000 he produced on the first day. He felt that this rate was as high as that of sighted workers. One worker pointed out that accuracy was more important on inspection jobs than speed, and he felt he was superior to sighted workers in this respect. Another said, "In gauging nuts, someone remarked that I am doing twice as many as a sighted worker." In the inspection of various parts used in lighting equipment, a worker said, "The blind produce more on this job—the plant keeps no figures on this job, but I have heard what sighted workers are producing, and I have out-produced them in most cases."

The testimony of management was in accord with these statements of blind workers. "I think their rate of error is lower than that of the sighted," said one supervisor. Another supervisor agreed with this, adding that blind workers were not as careless as sighted workers. One supervisor commented that when one blind worker was taken off an inspection job and transferred to another job, the sighted worker put on inspection failed to produce as much.

The few tests made by the time-motion engineer on inspection jobs again demonstrated the competency of the blind in inspection jobs.

In the gauging of pin holes with very small go-no-go gauge, the following comparisons were made.

As demonstrated, on the three days in which blind and sighted records were available, the blind worker made a better hourly average rate than the sighted worker. This record was exceeded later by a sighted worker who was placed on this job. She improved her output until it reached a high of 375. However, when another sighted worker was put on the job, production went down to 110 and 143.





Table 6

## GAUGING PIN-HOLES

Worker	Date	Average per Hour
Blind Worker A	February 11, 1944	296
Sighted Worker	February 11, 1944	172
Blind Worker A	February 12, 1944	222
Sighted Worker	February 12, 1944	162
Blind Worker A	February 22, 1944	332
Sighted Worker	February 22, 1944	154

In another gauging operation, gauging size of covers by fitting covers into a gauge, the following figures are available.

Table 7

## GAUGING SIZE OF COVERS

Worker	Date	Average per Hour
Blind Worker	February 17, 1944	300
Sighted Worker	February 2, 1944	223

Only three of the six blind workers in the inspection department are represented by these tests. There was no particular reason for selecting these three as all six are good workers.

The following figures are available for the gauging of tubes with go-no-go depth gauge.





Table 8

## GAUGING TUBES

Blind Worker A		Sighted Worker	
Date	Average Hourly Rate	Date	Average Hourly Rate
April 6, 1944	162	February 22, 1944	190
April 11, 1944	166	February 24, 1944	125
April 12, 1944	194	February 25, 1944	187
April 13, 1944	163	February 25, 1944	194
April 14, 1944	205	February 26, 1944	125
April 19, 1944	220	February 28, 1944	147
April 20, 1944	222	February 29, 1944	143
April 25, 1944	222	March 1, 1944	125
April 27, 1944	216	March 1, 1944	250
June 22, 1944	240	March 2, 1944	260
		March 4, 1944	181
		March 1, 1944	158
Average for period	203	Average for period	173

In gauging the thread in screw-hole cover, using a threaded tap gauge, the following figures are available. They are based on the total number gauged, on a full eight-hour day.

Table 9

## GAUGING THREAD IN SCREW-HOLE COVER

Worker	Date	Average Hourly Rate
Sighted Worker	May 12, 1944	50
Blind Worker A	May 12, 1944	58
Sighted Worker	May 15, 1944	51
Blind Worker A	May 15, 1944	55
Sighted Worker	May 16, 1944	60
Blind Worker A	May 16, 1944	74
Sighted Worker	May 17, 1944	96
Blind Worker A	May 17, 1944	74





The sighted worker was taken off this job on May 17, but the blind worker continued, achieving an hourly rate of 137 on June 2.

In another job consisting of a part inspection and part assembly operation, the figures are significant. The job was that of fitting brackets into housing. The highest rate ever recorded on this job for the sighted worker was 127, whereas the highest recorded for blind workers was 207.

Table 10

## FITTING BRACKETS INTO HOUSING

Worker	Date	Average Hourly Rate
Sighted Worker	April 26, 1944	63
Blind Worker A	April 26, 1944	153
Sighted Worker	May 5, 1944	77
Blind Worker A	May 5, 1944	162
Sighted Worker	June 19, 1944	111
Blind Worker A	May 25, 1944	188

Packing

Here, again, the testimony of blind workers was that they were as fast as sighted workers. One worker said, "I think I can tape boxes as fast, as well, and as efficiently as any sighted worker I have worked with." Another commented, "In the job of wrapping miniature lamps, I wrapped as fast as the sighted. Two other blind workers could wrap twice as fast as I could, so if I could do as well as the sighted, they are even faster than the sighted." One worker said, "In packing sleeves and rubber rolls, sighted workers were careless. I will say in justice





to them, that they did not want to do it. They knew they could get a better job, whereas we couldn't." Another worker engaged in wrapping miniature lamps said, "I think our record is a little better than that of the sighted."

Management was in agreement with the workers on this point. The story told by one of the supervisors is revealing.

I found by actual tests that the set-up with five blind workers, two sighted workers, and a sighted helper to carry materials for a rubber packing job, that this group did 25 per cent more work than a former set-up comprised of a group of sighted workers alone. They packed 8,000 rolls in one day on a rush order. That was an exceptional day, however. It wouldn't be fair to ask anyone to keep up that speed. I told them to relax when not rushed. Sixty-five hundred rolls a day was the average production.

This supervisor further pointed out that the rate of error of blind workers was much lower than that of sighted workers. In commenting on one blind worker's carefulness and accuracy, he said, "On three occasions rubber (which was overweight) was sent to the table, and he discovered it every time." Another supervisor said he felt the blind workers had the same output per hour on packing jobs as sighted workers.

There were no statistical data available on this job other than the supervisor's count mentioned in the last paragraph.

### Machine Jobs

This is one of the jobs in which blind workers felt they were doing better than sighted workers. One blind worker said that he could drill and tap more yokes a day than sighted workers could drill alone. Since he could drill faster than any sighted worker, when they were rushed, he drilled all day and let someone else do the tapping. He attributed his speed to organization of movements so that there was no





lost motion. He pointed out that the sighted workers' best output in drilling and tapping yokes was 2,000 a day, whereas his best output was 2,700. His average output was 2,300, whereas the sighted average was 1,500. Furthermore, he never had a rejection on this job.

A worker engaged in the vulcanizing mold-press operation said, "On the whole, I feel that my rate is about the same as the sighted." Another worker on this job pointed out that production depended on the number of rolls wrapped by a helper for placing in the molds. He had always kept up with the wrapper, he said, and neither he nor a sighted worker could do more than that. Another worker engaged in this operation remarked,

So far as I understand through the supervisors, they had rather have the blind on the presses as they are more careful. He explained. The press must be lowered carefully to prevent breaking the connectors, which are delicately constructed. Also, the connectors must be cooked the proper amount of time or they will be spoiled.

He thought he was more careful in handling this operation than sighted workers, thereby making his rate of error lower than theirs.

A worker whose job is reaming center holes on fibre contact on an electric reamer said his work was far ahead of that of sighted workers. He explained that he devised a method by which he could ream eight articles at a time, instead of the single one formerly drilled. Using this new method, he was enabled to ream 2,000 articles an hour. The best hourly average for the sighted was 543. The blind worker's best hourly average before using his new method was 750 articles.

Management was particularly enthusiastic about the competency of the blind workers on these machine operations. Referring to the blind drilling and tapping operator, a supervisor said,





He does better than anyone ever has on this job. He is doing almost three persons' work. I have eliminated the other two workers doing the job. This worker has picked up speed constantly, and has yet to reach his optimum.

Another supervisor, referring to a new machine job that had never before been done in the plant, stated, "A blind worker recently did an entirely new job bending guards by a hand machine. He turned out 1,500 in eight hours, which I'll say is very good." The supervisor who has charge of the mold-press operators said that the production of blind and sighted workers alike depended on the workers who wrapped the connectors to be molded. However, he felt that blind workers had fewer rejections than sighted workers. He also pointed out that some blind workers have done more than just the molding job, by taking over other operations, such as placing the mold in the press and removing it from the press.

The records listed below corroborate the statements of both management and workers. The first operation, reaming center hole on fiber contact on electric reamer, is as follows:

Table 11

## REAMING CENTER HOLE ON FIBER CONTACT

Worker	Date	Average Hourly Rate
Blind Worker A	August 31, 1943	540
Blind Worker B	August 30, 1943	750 (one at a time)
Blind Worker B	September 7, 1943	2000 (by using new method of 3 at a time)
Sighted Worker A	February 16, 1944	545
Sighted Worker B	February 16, 1944	83

The record above indicates the highest and lowest rate of output of sighted workers on this operation. Blind worker B is the one referred





to who devised the system of reaming eight contacts at a time. Note that his production was boosted from his former high, using the old method, to 2,000, using his new method.

In the tapping and drilling operation, the following figures are available.

Table 12

## TAPPING AND DRILLING

Worker	Date	Average Hourly Rate
Blind Worker A	September 7, 1943	400
Blind Worker A	September 22, 1943	420
Blind Worker A	October 3, 1943	397
Blind Worker B	September 9, 1943	425
Blind Worker B	September 22, 1943	470
Blind Worker B	October 3, 1943	500
Sighted Worker	September 9, 1943	285
Sighted Worker	September 22, 1943	320
Sighted Worker	October 3, 1943	270
Sighted Worker	September 7, 1943	240
Sighted Worker	September 22, 1943	200

Neither of these two workers are the ones mentioned above doing this work. These workers operated press only occasionally, whereas the other has operated it steadily for the past seven months.

Figures above are from a series of tests made between September 7, 1943, and October 3, 1943. The production figure given represents the average rate per hour for a full eight-hour day.

In the operation of counter-sinking holes on lamp contacts on the electric drill-press we have the following single comparison.





Table 13

## COUNTER-SINKING HOLES ON CONTACTS

Worker	Date	Average Hourly Rate
Blind Worker A	February 14, 1944	85
Blind Worker B	February 16, 1944	143
Sighted Worker	February 15, 1944	123

The supervisor found blind worker A better adapted to assembly work than to this machine operation. Tests were made on consecutive days. It was not possible to have the blind and sighted workers on the job simultaneously, since there is only one drill-press for doing this work.

Old Jobs

Blind workers felt that their production on jobs in this classification was also ahead of that of sighted workers. One worker commented that a sighted worker, resenting his superior speed, said, "Hey, slow down, what's the hurry?" The worker explained that he was not consciously attempting to outproduce the sighted worker but was rather trying to complete as much material as possible for the fighting forces. Comments of workers on old jobs ranged anywhere from the statement of the blind worker engaged in stamping tags, who said, "My work is better than theirs" (sighted workers), to the comment of the workers tying knots and cutting wire who said their work was as good if not better, both from standpoint of quantity and quality.

Management concurred again in the view of blind workers. One supervisor in charge of workers separating coiled springs (shipped in





tangled and intertwined bunches, necessitating their separation) said, "Blind workers consistently made a higher average on this operation than sighted workers." Another supervisor, referring to the worker stamping tags, said, "His work is as good as any sighted worker's. On stamping tags he is even more accurate. I wouldn't trade him for two sighted workers." Still another supervisor in charge of various odd jobs stated that blind workers as a whole were as good as sighted workers.

The records available for two operations classified under odd jobs supported these views of management and worker. In the operation of separating bunches of springs, the following counts were taken.

Table 14

## SEPARATING BUNCHES OF COILED SPRINGS

Worker	Date	Average per Hour
Blind Worker A	April 13, 1944	600
Blind Worker B	April 24, 1944	680
Blind Worker C	May 24, 1944	500
Average per hour for blind workers		593
Sighted Worker	February 19, 1944	255
Sighted Worker	March 6, 1944	388
Sighted Worker	April 10, 1944	407
Average per hour for sighted workers		309

These figures are based on hourly rates on a full eight-hour day on tests made between February 19, 1944, and May 24, 1944. The time-motion engineer thought performance of the blind on this operation particularly remarkable inasmuch as sighted workers could see how springs were coiled together and could proceed to untangle them methodically. The blind had to proceed from touch alone, but even so, outproduced the





sighted.

In the second operation, that of cutting lead wire to proper lengths, the following record was made.

Table 15  
CUTTING LEAD WIRE

Worker	Date	Average per Hour
Sighted Worker	August 28, 1943	460
Blind Worker A	September 10, 1943	464
Blind Worker A	September 22, 1943	460
Blind Worker A	October 22, 1943	545
Blind Worker A	November 3, 1943	800
Blind Worker A	November 18, 1943	860
Sighted Worker	January 10, 1944	222
Sighted Worker	February 21, 1944	330
Sighted Worker	February 28, 1944	427
Sighted Worker	March 20, 1944	300
Blind Worker B	April 25, 1944	455
Sighted Worker	May 2, 1944	335

Blind worker A was moved to another job, and a sighted worker replaced him. Production dropped from an hourly average of 860 to 222. On April 25, when another blind worker was placed on the job, blind worker B, his hourly rate was 455. The highest record of any sighted worker during the test period was 427. The supervisor considered these figures particularly significant, since the sighted worker could see the marker (measuring length of wire) while the blind had to rely on their sense of touch.

#### Maintenance, Repair, Supervision and Clerical

The three remaining jobs, Maintenance and Repair, Supervision,





and Clerical, will all be commented on together, inasmuch as they were non-production jobs. Although the output of blind workers at these three jobs could not be measured by the same quantity and quality standards applied to production jobs, the performance of the blind was equal to that of sighted workers, or even better, according to the testimony of blind workers.

One supervisor of the stock room, who is blind, pointed out that he had been selected from among 500 workers, blind and sighted, because he was thought to be best fitted for the job. No plant standard for his job has been set up; he simply worked out his own independent methods for handling it. That these methods were very good is revealed in the statement of the supervisor, who said he could not suggest any improvement on the job. The blind worker engaged in maintenance and repair remarked, "I can't keep track of whether my stuff breaks down or not. It is hard to check up. I know that I go into it more thoroughly than others do." The blind clerical worker also felt that she did as well as any sighted worker could have done in her job.

Management was particularly enthusiastic about the blind supervisor. The supervisor in charge said, "I chose this worker out of 500 workers because he is unusually capable and has real initiative. He set up his own stock room methods — I just guided him. His system was so good that I could make no improvements." This supervisor pointed out further that this worker had exceptional intelligence, and a desire to get ahead that made him stand out above many sighted employees. The supervisor in charge of the maintenance and repair worker made the only dissenting comment. He said, "He is not as good as the sighted worker (on the day shift), but it is not a fair comparison as the sighted worker





is very skilled. He is older and has had many years of experience, whereas this worker knew nothing about the work when he assumed the job." However, as this blind worker came to be more familiar with the job the supervisor became more satisfied with him. No comment was available from the supervisor in charge of the clerical worker, but it is presumed that, as she was kept on the job until changes in orders caused her to be transferred to another department, her work was satisfactory.

### Efficiency

The statements listed above, along with corroborating statistical records, indicate that the blind worker's output, both from the standpoint of quantity and quality, is as good as, and in some cases superior to that of the sighted worker. How were the blind able to achieve such results? It has been noted, in previous sections, that the blind worker, because of his visual limitation, was compelled to achieve a superior organization of work and material. As Enid Griffes points out:

Blind men and women early learn care and precision in their movements and orderliness in their working habits. You will seldom find a sightless worker indulging in waste motion or misplacing his tools or working equipment. This means time saved, greater economy of movement and effort, and a higher rate of production.<sup>2</sup>

The individual efficiency of the blind workers varied, depending on the amount of their intelligence, initiative and ingenuity. However, some enterprising workers went far beyond such necessary occupational organization, by devising new and speedier methods in handling their material. In this section, an examination will be made of the manner

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<sup>2</sup> Enid Griffes, "The Blind Do It Better," Harper's Magazine, April, 1943, p. 523.





in which various workers organized their work to reduce movements to a minimum, and how they arranged their materials to facilitate speedy handling.

In the last section, it was noted how one worker, by organizing his movements, was able almost to triple the production of sighted workers in drilling and tapping yokes. In the worker's own words,

I used both hands, working on separate operations simultaneously. I coordinated every movement to prevent any waste of time or motion. I have drilled 580 yokes an hour (top speed), but if each yoke is drilled completely before another has been started, this number would be reduced to one half.

He listed the following organization of his movements on the drill-press.

- (1) Places 50 to 100 yokes on ledge of table to left of drill.
- (2) Picks up yoke with left hand and places it in jig machine.
- (3) Pushes wheel forward with right hand. (Explained that wheel is shaped like a three-spoked rimless wheel. Instead of wasting time and energy reaching up for handle and pulling it down, he takes spoke in front of him and pushes it forward. It is the push forward which takes less energy and time.)
- (4) As soon as drill takes hold of yoke, he lets go with his left hand and reaches for another yoke, which he inspects for defects. This inspection is therefore being done while hole is being drilled in yoke on machine.
- (5) After hole is drilled, turns yoke in machine over with both hands to drill the second hole on the other side.
- (6) With yoke in left hand he brushes off the hot shavings. (Would be dangerous to let the hot shavings accumulate.)
- (7) When second hole has been drilled in yoke on machine, it is flipped off the jig by his right hand. It falls into box which has been placed at the right in exact position to catch completed yokes.
- (8) Almost simultaneously he places yoke in left hand on jig to repeat the operation.

On the tapping machine, the worker listed this organization of his movements:

- (1) Places yokes to left of machine (holes now already drilled in yoke, but are tapped to clean out the screw thread holes.)
- (2) Picks up yoke with left hand and slides it on tapper.
- (3) Pushes yoke against machine which starts the pin in machine to revolve.





- (4) As soon as tapper has gone through screw hole to proper length (protrudes on opposite side about one eighth of an inch) he pulls it toward him with right hand. This causes a reversal of tapper to release yoke.
  - (5) Meanwhile, left hand is picking up another yoke to be put in place after first yoke has been completed.
  - (6) When yoke is completed it is placed in box by his right hand, which has removed it from tapper.
- All of this operation is a constant motion from left to right.

This worker, by arranging his work in an orderly, systematic way, to reduce time and motion as much as possible, increased both his speed and accuracy.

The assembly job was also well thought out. As said before, a blind person, in order to work independently of others, must arrange his materials so that he knows exactly where each article is placed. In assembly, separate parts are placed in separate bins of a long box.<sup>3</sup> The blind worker has to learn in which bin various articles are placed so that he can reach there for the parts he wants. The work proceeds from left to right, so that completely assembled parts are placed to his right.

A similar procedure was followed in inspection jobs. Here, the blind worker places materials to be inspected on his left, then inspects the part in front of him, and next puts approved parts in a box in front of him. Rejected parts are cast into a box at the right. The movement to the box in front, being easier and involving less motion, is reserved for approved parts, since more parts are approved than rejected. A supervisor pointed out that if material is in disarray, mistakes may be made. He said the sighted workers often times do not think it necessary to have such order inasmuch as they can see the materials they work with.

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<sup>3</sup>These divided bins were used for both blind and sighted workers alike.





Consequently, they are prone to be careless and pick up wrong items. The accuracy of blind workers was attributed to the care with which they order their materials.

Good organization was also effected in the packing jobs. One worker said,

In packing red and green filters for flashlights, numerous mistakes were made. Sighted workers would carry their work over to a table of a friend to chat, and often mix the green and red filter. I tried to avoid mixing colors by having the red and green filters stacked on different tables. If I was told correctly of their location, I would pack correctly.

This is one of the occupations considered out of the range of blind workers because of the color factor. The worker proved that other means can often be devised for operations in which color is thought to be the only determinant.

In a counting operation, a blind worker devised a system for counting rubber and metal sleeves which saved three fourths of the time formerly consumed. Sighted workers had formerly counted two hundred lots by picking up each part with one hand and counting it separately. The blind worker thought such a count was a waste of time and motion. He decided it was better to pick up two parts in each hand, but count them as one. In this way, he could count up to fifty, but by having two parts in each hand the actual count was two hundred.

Another blind worker devised a system for packing seven boxes at a time. He would line up seven boxes in front of him, and stack rubber on his right side. He would then pick up rubber rolls and slip one in each box until all seven were filled.

The reaming operation, mentioned in the last section, was performed by a blind worker with unusual efficiency. He reamed eight





contacts at a time, instead of reaming each one separately as the sighted workers did. He did this by stacking the eight contacts, placing them under the reamer, and then drilling holes through all eight at one time. He tried this operation at first as an experiment, but results proved to be so accurate that he did it regularly. His output jumped from 750 (his best speed at the old method which even then exceeded the best speed of sighted workers) to 2,000 an hour.

The blind supervisor of the stock room, who has one of the most responsible positions in the plant, devised many ways of handling materials to increase efficiency. He organized and systematized his stock to minimize his dependence on the sighted. He was so successful that he needs their assistance now only for keeping records, and he felt he could even do that alone with the use of braille. The stock is arranged in chronological order. The oldest materials are made the most accessible; the parts most recently received are farthest away. He keeps this order by arranging the stock on his shelves from bottom up, according to age of material. He keeps the entire inventory of his stock in mind, and knows exactly where to go for various items. He has reduced wasted motion and delays, by devising a bell and buzzer system to distinguish window requests from door requests, inasmuch as noise in the plant made it difficult to distinguish voices from the door or window. (He receives new stock through the door, and handles requests for materials through the window.) The buzzer indicates a door request, whereas the bell indicates a window request. Therefore, he knows exactly where to go when he is needed.

In addition to being efficient, indications are that these blind persons have other qualities which make them valuable workers. Supervisors point out that absenteeism and tardiness among them is very low,





whereas among some sighted workers absenteeism constitutes a real problem. One supervisor said, "The attendance of the blind is 100 per cent." Another one commented, "They are never late and never off." Another said, "Their attendance is very good. A blind worker is never out if it is possible to drag himself in." And another declared, "They have no objection to overtime. They will work nine hours a day without complaint."

They also remarked that blind workers were unusually reliable. As one supervisor said, "We let blind workers do jobs alone more than we do sighted workers. Once the blind persons have the knowledge needed, we know that they will do a job right. We have no hesitancy in leaving them on their own." Another said,

They are steady on the job, and they are competent and reliable. They also assume responsibility. If anything goes wrong the blind worker will call someone. He will not try to force the parts together and spoil them. Sighted workers on the other hand will often force things and ruin them.

Supervisors pointed out other qualities of blind workers, such as conscientiousness, cooperativeness, initiative, persistence and caution. As one supervisor said, "They have the will to work and overcome things." Another commented, "There isn't a thing you could ask about their work that they wouldn't know." Still another said, "They are more cautious than sighted workers," and another, "They catch more mistakes than sighted workers do. One commented, "Blind workers are at their jobs steadily and persistently, taking time out only during rest periods."

#### Date of Accident

According to the production manager, there have been no accidents





involving blind workers at the Mines Equipment Company. This may be attributed to the unusual care and caution taken by blind persons to avoid risks. These workers all admitted that they were exceptionally aware of the hazards involved in working with dangerous machines, or in walking about in parts of the plant where moving trucks and stacks of material might trip and injure them. This awareness of handicapped people to dangers and the extra precautions they take to avoid them is not limited to the Mines Equipment Company. As the Ordnance Officer of the War Department at Fort Sill, Oklahoma, said, "Experience proves that accidents are much less with the already physically handicapped than with the able-bodied because they apparently recognize their handicap and their loss, and have been made careful by this continuous reminder."<sup>4</sup>

It is true, however, that most of the jobs blind workers are engaged in at the Mines Equipment Company do not involve unusual risks. This is due to the care with which blind workers were placed. As the production manager pointed out, "They were mostly placed in jobs where they couldn't get hurt. If they were placed at a machine, certain precautions were taken to prevent injury." The machine jobs holding potential dangers were such as the drill-press and reamer, where the worker's hands could be tangled; the wire cutting machine and staker, which could cut the worker's hands; and the mold-press, which, because of its high temperature, perils the worker's body and hands if he is not careful. Yet, the unusual precautions taken by these blind workers, and the care with which they organized their work to avoid unnecessary

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<sup>4</sup> Blind Workers in United States Industries, compiled by Lawrence Q. Lewis, National Society for the Blind, Washington, D.C., 1943, p. 16.





hazards, saved them from accidents.

Also, certain risks were involved in walking about parts of the plant where moving trucks and stacks of material might injure them. Although workers familiarized themselves with objects in their immediate vicinity, and could move about with apparent safety, nevertheless when they had to go through less safe areas they recognized that it would be dangerous to go alone. They would wait to be escorted through dangerous parts of the plant by sighted workers going the same direction, not only to avoid injury to themselves, but to avoid injury to others as well. One worker voiced the feeling of all when he said, "It would be dangerous to attempt going about alone. I have never had an accident. That's because I recognize my limitations and exercise patience. I wait for someone to help me."

We have the testimony of Lawrence Q. Lewis, director of the National Society for the Blind, that the lack of accidents is not a condition peculiar to the Mines Equipment Company. He makes the astonishing statement: "We know of no reported injuries of blind persons in industry in the whole United States."<sup>5</sup>

The supervisors were particularly impressed by the safety record of the blind. As one of them said,

Not only are the blind no greater safety risk than sighted workers, but because of their presence we have become more shop conscious about such things as leaving objects in the aisles and where they ought not to be. We have thus improved conditions and lessened the danger of accidents for all our workers, sighted as well as blind. From a safety standpoint, the blind are really an asset.

However, in spite of such evidence as this, and other evidences on

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<sup>5</sup> Lawrence Q. Lewis, in letter to the writer, April, 1944.





a national scope, many employers refuse to hire the blind on the basis that blind workers are more prone to accidents, and therefore a liability to management. They fear that the blind worker's alleged susceptibility to accidents will cause premiums to rise on workers' compensation insurance.

This concept is completely false, having no basis in fact. We have the evidence of the Mines Equipment Company production manager, who said, "All insurance companies, both public and private, dealing with workers' compensation, accept blind workers on the same basis as the sighted. There is no extra cost to employers in employing blind persons." We also have statements of insurance officials themselves supporting this. As one insurance official pointed out:

We are somewhat familiar with the statement that agencies for the blind find that employers refuse in some instances to cooperate with the employment of the blind on the basis that private insurance companies will not permit the absorption of handicapped workers. There is nothing in any policy of workers' compensation insurance which interferes with the proper placing of blind persons in industry. Not only is there nothing in the insurance contract itself that limits an employer in the right of selecting blind workers, but there is nothing in any formula of premium rates for such insurance that takes into account the physical handicap of any employee.

Again, the vice president of a large insurance company pointed out,

To my knowledge there is nothing in any compensation law or compensation insurance contract that would bar the proper employment of a blind person. There is surely nothing in our contract that would bar the employment of blind persons.

So actually, employers are not compelled to pay extra premiums for employing the blind. Probably what they have in mind is that their merit rating may fall if the number of accidents should increase due to the presence of blind workers.

Probably, too, such employers may be thinking of the liabilities which they believe themselves involved in in second injury





accidents. For instance, in 1932, in an Oklahoma City plant, a worker with defective vision in his left eye was hired. Later, he received an injury in the right eye which rendered him totally blind. A court ruled that the employer was liable for total disability compensation, rather than the compensation normally allowed for partial disability, such as the injury of one eye would usually involve. As a result of this ruling, 7,000 partially handicapped persons lost their jobs in the state of Oklahoma because employers were unwilling to assume the broad liability that this decision imposed.<sup>6</sup>

This situation was changed, however, and it should be pointed out that twenty-three states, including Missouri, have enacted second-injury fund legislation. In effect this legislation absolves employers from paying more than would normally be paid for the partial disability caused by the last injury considered by itself. The employee will be paid compensation for the disability resulting from the combined injuries. The difference between the cost, for example, of the loss of a second arm or leg, and the cost of compensation for permanent total disability, will be paid out of a second-injury fund. This fund, provided for by various financing arrangements in the twenty-three states, takes care of the rest of the compensation due the totally handicapped worker.<sup>7</sup>

The actual number of second-injuries that result in total disability is very small -- a fraction of 1 per cent. As to the belief that handicapped persons are more liable to second injuries than normal

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<sup>6</sup> Second-Injury Funds as Employment Aid to Handicapped, U.S. Department of Labor pamphlet, 1944, p. 27.

<sup>7</sup> In some of the twenty-five states which have not enacted legislation providing for second-injury fund, physically handicapped workers must waive their right to compensation.





workers, we have these words of a noted authority:

There persists in the minds of employers the idea that the existence of a disability makes the worker more susceptible to a second injury. Actually, the records reveal that physically handicapped people who are intelligently placed in suitable jobs are the safest workers in the world. Even in the case of the totally blind, who have been employed in industry for the past forty years, there has not yet been a major compensable accident in any of the many plants and factories in which they are employed.

He goes on to cite evidence similar to that cited by the writer. "The reason is that the physically handicapped are more careful to obey safety regulations."<sup>8</sup>

### Summary

Testimony presented by blind workers, and corroborated by their supervisors makes it evident that in all types of work performed by blind workers at Mines Equipment Company, the quality of their work and their speed in executing each operation was generally equal and sometimes superior to the work done by sighted workers on the same job. In some cases, the blind showed real initiative in increasing output and efficiency, as for example, the worker who devised a method of reaming center holes in fiber contacts whereby he was enabled to ream 2,000 articles per hour in comparison with his best previous hourly average of 750, an increase of 205 over the best sighted worker's average on the same job. Statistical comparisons further bear out the fact that on every job on which blind workers were employed, their output always compared favorably with, and often exceeded, that of the sighted worker.

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<sup>8</sup> Verne K. Harvey, Medical Director of U.S. Civil Service Commission, in an address before National Safety Congress at Chicago, October 6, 1943.





While quantity and quality standards could not necessarily be used in measuring performance of blind workers in maintenance, repair, supervisory, and clerical positions, performance set standards achieved by sighted workers, and in many cases surpassed them.

Because of visual limitations, the blind worker must organize his work to a high degree if he is to perform his task efficiently. The result is that both from a quantitative and qualitative standpoint, his output is as good as, and in some cases superior to, the output of the sighted worker. The blind worker's necessary organization of his job saves time, effects greater economy of movement and effort, and achieves a higher rate of production.

In addition to efficiency, blind workers have other valuable attributes as industrial workers. The rate of absenteeism and tardiness among blind workers is negligible. And, according to supervisors, blind workers are unusually reliable, as well as conscientious, cautious, cooperative, and persistent in the execution of their duties.

According to the production manager, there have been no accidents involving blind workers at Mines Equipment Company. Probably, this is due to the unusual amount of caution exercised by the blind to avoid risks, and to the fact that no blind workers were placed on jobs that held threat of injury to the sightless.

Many employers deny blind workers employment on the ground that the blind are more liable to accidents, and therefore will cause premiums to rise on workmen's compensation insurance. Actually, no insurance company contract dealing with workers' compensation interferes with the proper placing of blind persons in industry; nor is there anything in the formula of premium rates for such insurance that takes into account the





physical handicap of any employee.

Therefore, employers who refuse to hire blind persons probably fear that such employment may decrease their merit rating because of the greater possibility of accidents. Also, they may be fearful of involving themselves in total compensation when a second-injury has been incurred. However, twenty-three states have enacted second-injury fund legislation which absolves the employer from paying more than would normally be paid for the partial disability caused by the last accident considered by itself. The actual number of second-injuries resulting in total disability is a fraction of 1 per cent. And because physically handicapped workers are more careful to obey safety regulations, they are, when intelligently placed in jobs suited to their capabilities, the safest of all workers.





## CHAPTER V

## ADAPTABILITY

Introduction

One requirement considered essential by management is that a worker be flexible enough to shift from one operation to another within the plant as occasion demands. It is on this point that management has raised one of its chief objections to the employment of the visually handicapped worker. It has too often been assumed that blindness in itself hampers a person to such an extent that it would not be profitable to hire him. The attitude of management seems to be that if handicapped workers are hired then it becomes necessary to hire additional workers who can perform the tasks that the so-called lack of flexibility of the handicapped worker hinders him from performing. They assume that because a person is sighted he will be able to perform any job he is called upon to perform. The attitude towards the sighted worker is positive, while the attitude towards the blind is negative, emphasizing the things he can not do rather than the things he can do.<sup>1</sup>

If it were true that the blind worker could perform only one or two operations and could not be transferred to other types of work, the employers would be justified in their objection. However, the findings of this study indicate the contrary. These findings are briefly

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<sup>1</sup>Lawrence Q. Lewis, "Employment of Blind Persons in the United States," Proceedings of 20th Biennial Convention of the American Association of Workers for the Blind, 1943, p. 90.





summarized in the statement of one of the supervisors, who said:

All workers have some problem, are limited in different ways. The blind person's problem just happens to be different, but not necessarily more difficult to overcome. They have demonstrated their ability to perform a variety of jobs, and have convinced supervisors of their skill and adaptability. I am extremely optimistic about the possibilities of jobs open to blind individuals who show interest, intelligence, and imagination. I think their possibilities are unlimited if supervisors can provide them with the information needed to do certain jobs.

Another supervisor remarked that sighted workers are not so adaptable as one ordinarily believes them to be. "The average of sighted workers who are really adaptable is about one in ten. In many cases where a sighted worker is hired to do a certain job we find he can't do it, and shift him until we find a job he can do satisfactorily."

Management has raised two other objections to the employment of visually handicapped persons which may be considered in this connection. One is that a feeling of skepticism has arisen over the ability of the blind worker to achieve a sufficient degree of independence to perform his job without demanding a disproportionate amount of time and attention from the supervisors and from other workers in the plant. Another is their fear that the blind worker will be a personal care, requiring too much assistance from sighted workers in getting around the plant, and to and from the plant.

In the following sections we will consider the adaptability of blind workers at the Minox Equipment Company to determine the validity of management's objections. The workers' adaptability will be considered under: (1) adaptability to industrial processes; and (2) adaptability to occupational environment. However, first, let us examine what some of the generally considered occupational restrictions





of blind workers are.

### General Occupational Restrictions of the Blind

It is true that the condition of blindness inevitably imposes certain limitations upon the individual which must be recognized realistically if judicious assignments to industrial work are to be made. There are certain things which a blind worker obviously can not do, although they are fewer than generally believed. A blind worker, for instance, can not work with articles where color is the only determining factor. But he can work with these articles if it so happens that the articles of different color are also of different size, as this can be perceived through his tactual sense. The blind person is forced to use his resourcefulness in finding other ways of doing things sighted workers do. Instead of relying upon his sight, he relies upon his four remaining senses. He widens their use by using his imagination and ingenuity.

Blind persons differ in the degree to which they make use of these resources, and therefore they differ in the degree to which they are limited in action. Like sighted workers, they differ in intelligence, interests, personality, skills, etc. The only trait they actually have in common is their blindness. The most obvious and also the most serious limitation is lack of freedom of movement. However, here again, individuals vary. Some are able to orient themselves to unfamiliar surroundings quickly, while others are not.

According to Michael Eupa, Supervisor of the Physically Handicapped Personnel, of the International Business Machines Corporation, the restrictions of the blind are three-fold. He states:





First, there is the group of restrictions normally associated with blindness. Among these may be listed the confinement within the potentialities of the four remaining senses, difficulty of movement, and curtailment of social activities. Within this group of restrictions there is no foundation for considering people with visual handicaps as a distinct class for the effects of these restrictions are inversely proportional to the inherent drive and personal initiative of the individual upon whom they have been imposed.

The second group of restrictions are, if not self-imposed, then often times self-perpetuated. They arise from a lack of knowledge of occupational process that can be successfully performed by the blind. Anyone who strives for financial independence can not avoid a personal inquiry into occupations offering probable success -- even though the possibilities of these, as yet, may not have been explored.

The third and last group must be labelled as social. These restrictions consist of society's ignorance of the true significance of blindness, accompanied often times by an illogical disbelief in capabilities remaining unimpaired by the condition of blindness.<sup>2</sup>

Although these last two restrictions are important factors in determining the place of the blind worker in industry, our real concern here is with those occupational restrictions which the condition of blindness itself imposes. What are the real limitations of the blind that management must take into account in placing them in industry? These limitations are indicated by the following classification, which was made by an authority on placement of the blind in industry.<sup>3</sup>

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<sup>2</sup>Michael Supa, "Industrial Placements from Viewpoint of the Personnel Office," Proceedings of the Twentieth Biennial Convention of the American Association of Workers for the Blind, 1943, p. 151.

<sup>3</sup>This list was given to the writer by Mr. J. F. Clunk, Chief, Services for the Blind, Federal Security Agency during a personal interview. It is a policy of this agency not to publish lists of occupational restrictions or lists of jobs which can be performed by the blind. It was feared that employers would interpret these lists too literally and not take into consideration variations in amount of resourcefulness of blind workers, as well as extenuating circumstances that may surround the job. The experience of blind workers in industry has demonstrated that the number of limitations is constantly decreasing while the number of suitable jobs is constantly increasing.







### 1. Size of Articles to be Handled

Articles should be of medium size, within arm reach so that they can be manipulated through the sense of touch. If an article is too small, such as the parts of a watch, they can not be distinguished easily. Neither should the blind person work with objects too large or heavy, such as wooden or metal boxes which have to be lifted with a crane. A crane ordinarily lifts the heavy object to a level determined by sight. Since this is beyond the reach of the blind person he would not be able to indicate the level.<sup>4</sup> However, if the large object is light and within the reach of the blind worker it would not be considered out of the realm of the blind worker. Generally speaking, only articles of medium weight and size should be handled by blind persons.

### 2. Movement over a Large Area where Hazards Exist

Movement over a considerable area is regarded as impractical if that area has obstacles which impede easy travel. Such things as open shafts, stairways, shifting trucks and stacks of boxes or materials would make travel for a blind person hazardous. There is the possibility, too, that the worker may not only endanger himself, but others who may be in his path. However, if the area consists of open spaces which are not cluttered, and where objects are not moving about, the blind person is able to manage without difficulty or danger.

### 3. Determination of Color

Where determination of color is the sole factor in identifying an object, the blind are obviously limited. For instance, if wires of

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<sup>4</sup>Any object beyond the reach of the blind worker is considered to be beyond his "focal limits," a term originated by J. F. Clunk to indicate anything within the tactual field of the blind.





equal proportions are to be matched according to color, and there is no other means of differentiating the wires apart except by color, the blind person would naturally be unable to perform this type of work.

#### 4. Use of Adhesive Materials

The use of adhesive materials where stickiness obscures or interferes with the sense of touch is not advisable for blind persons. The work might be performed by frequent washing of the hands but this would take additional time thus reducing the rate of production.

#### 5. Printed Matter

If printed matter can be determined only by sight this would be beyond the limits of the blind. There are certain conditions, however, which make this type of work available to the blind. Where the card or paper is of irregular shape, or where the print has left a depression, the printed side, as well as top from bottom, may be detected through the sense of touch.

#### 6. Use of Gloves or Tongs

The use of gloves or tongs in handling extreme heat or cold or sharp edges is impractical. Gloves or tongs would interfere with the sense of touch.

#### 7. Operation of Machines Where Control is Not with the Worker

The blind worker faces a hazard in the use of machines where control does not exist with the individual. Sight is necessary for the safe operation of such machines. However, where a blind worker can control his material and machine without coming in contact with the dangerous parts he can perform the operation without risk.

#### 8. Large Metal Shavings

If shavings from metal which is being cut by a machine are too





large or sharp this would be considered a dangerous operation for blind workers. Sighted workers can see to get out of the path quickly. If shavings are small and therefore not harmful the operation can be performed successfully by the blind.

The above classification applies to totally blind persons. These limitations naturally diminish in direct proportion to an increase in vision. The term totally blind here included the varying degrees of vision ranging from no light perception to the ability to distinguish large objects and colors. As this detailed analysis of limitations reveals, even the officially recognized limitations of blind workers have certain qualifications. This study indicates these limitations hold generally. However, apparent limitations may be overcome by the use of ingenuity on the part of an intelligent and resourceful worker. This was so vividly demonstrated that the writer was forced to reconsider whether the only real limitations were those imposed by lack of initiative and resourcefulness on the part of the worker, except in certain cases where sight is essential. Frequently the deciding factor is the spirit of the person to succeed in a job in spite of his physical handicap. Dr. A. F. Lee Klider said, "We tried to attach too much weight to physical defects. More often I was impressed with the mental or character type of the injured individual than I was with his physical make up."<sup>5</sup>

#### Adaptability to Industrial Process

The above list of limitations did not prevent the workers considered

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<sup>5</sup> Dr. Lee Klider's statement quoted by Dr. D. L. Lynch in "Employment of the Physically Handicapped," American Medical Association Journal, Industrial Health number, March 29, 1941, p. 1303.





in this study from performing a wide variety of jobs. The following list of jobs performed by each of the eighteen workers illustrates their versatility. The various operations performed are classified into types according to function. The type of work in which the worker is currently engaged is indicated by an \*. Other types of work in which he is engaged occasionally at the present time, or has performed in the past, are indicated by an X. The total number of jobs performed by each worker since his date of employment is indicated in the extreme right hand column. In addition, the total number of workers who have performed each type of work is indicated at the bottom of the table.

Table 16

NUMBER AND TYPES OF JOBS PERFORMED BY  
EACH WORKER SINCE EMPLOYMENT

Worker	Inspection	Assembly	Pack- ing	Machine Opera- tions	Repairs and Main- tenance	Super- vision	Cleri- cal	Odd Jobs	Total
A		X		X	*			X	4
B	*	X	X				X		4
C		*		X				X	3
D				*					1
E		X	X	*				X	4
F	X	*	X	X				X	5
G	*	X	X	X				X	5
H		X		*				X	3
I	X	X	X	*				X	5
J	X	X		*				X	4
K	*	X	X	X				X	5
L	*	X	X	X				X	5
M	*	X	X	X				X	5
N	*	X	X					X	4
O	X	X			X	*		X	5
P		X		*				X	3
Q	*								1
R	*	X			X			X	4
Total	12	16	9	13	3	1	1	15	





Actually, the variety of work is much greater than the chart indicates, since each type of work includes a number of operations. A worker listed as doing an inspection job may be performing as many as twenty-five operations under that job.<sup>6</sup>

This table reveals that seven workers have engaged in five different types of work; six in four types; three in three types. Only two have performed one type of work exclusively. These last two workers were among the last employed by the company and during their short period of employment have been performing operations particularly vital at this time. If they follow the pattern of other workers they will probably be shifted to other jobs when a lull occurs in the operations they are now performing.

Management was at first inclined to limit these workers to the performance of one or two operations, since they were unfamiliar with the aptitudes of blind workers. It was only after the workers demonstrated their ability on other jobs that management was convinced that blind workers could perform more than a few simple operations. With greater cooperation from management in discovering jobs and in training blind workers for them the indication is that these workers could perform even a wider variety of jobs than those currently performed.

Although workers were first brought to the plant to do the simple operation of stringing insulation leads on wires, they, and other workers who followed, were permitted to do progressively better jobs because of the competence demonstrated by these first workers. Now did they prove to management that they were able to do more than this circumscribed list

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<sup>6</sup>See Appendix F for list of operations performed under each classification.





of one or two simple tasks? Job opportunities for the blind were increased in three different ways. First, orders for material which blind workers were producing ran out, forcing management either to find other jobs or to release these workers. Second, some workers, eager to prove their versatility, explored the operations involved in other jobs on their own initiative. When the supervisors learned of this, they not only assigned those workers to the new jobs, but often assigned others as well. Third, the supervisors' confidence in the ability and versatility of the blind increased after the blind had been in the plant for some time, with the result that they searched out new job opportunities for them. Some typical case studies on each of these points will illustrate how this wider range of jobs grew, and how successful the workers were in adapting themselves to them. Actually, many of these points overlap.

When the plant reached its quota on the first job assigned to blind workers, supervisors were forced either to find new jobs for the workers, permit them to remain idle until new orders came in, or release them from employment. The task of finding other jobs for them was made easier by one enterprising blind worker who learned how to operate an eyelet machine while the other workers were still engaged in the insulating operation. After demonstrating that he could operate it, and proving it could be done by other blind persons, the supervisors placed other blind workers on this job. When the government orders for this particular product began to slow down, the supervisors transferred them to the Vulcanizing Department where they performed a variety of packing operations. This transfer of workers resulted in the discovery of numerous jobs for the blind.





One of the most important factors in determining new jobs has been the initiative and resourcefulness demonstrated by the blind workers themselves. One worker remarked, "I talk to other workers about their jobs. I express an interest in finding out how they are done. In this way I have learned how to do many jobs. When the supervisor discovered I could do them he permitted me to take over." Another worker said, "I went cruising around just out of curiosity. In one department I listened to comments about the electric sealer and drew my own conclusions as to whether or not it would be suitable." This worker asked to be shown how to operate the sealer, discovered she could do it successfully, and from then on was permitted to operate it. "Otherwise they would never have allowed us to use this sealer; it was too dangerous." Another worker has performed over one hundred different operations, according to his supervisor, and has tested other operations which he believes blind workers are capable of performing.

The third factor relates to initiative demonstrated by the supervisors in seeking out new job opportunities, after experience with the blind had generated confidence in their ability. At first, supervisors would only seek out new opportunities when driven to it by necessity, as they were not aware of the capabilities of the blind. Now, some of the supervisors are alert in searching out new job opportunities.

They were soon amazed to discover what the blind could do. As one worker stated, "They didn't realize when we started that we could do one quarter of the jobs we are now doing." Once their abilities had been demonstrated, supervisors began to analyze jobs carefully to see what types of operations were suitable for blind workers. According to one worker, one of the supervisors was so alert and enterprising in finding jobs that "sometimes she told me I could do jobs I wasn't sure





myself I could do." Recently supervisors decided to turn over a new job, never before performed in the plant, exclusively to blind workers. A guard, which is a U-shaped piece of metal formerly purchased from outside producers was to be made in the plant. The trial of one blind worker on this job was very successful. He produced 1,500 guards in eight hours. The supervisor was so impressed that he said, "From now on we'll be turning more of these jobs over to blind workers."

One supervisor is still surprised at what they are able to do. "I know they can't go on the production line in my department, but I have been fooled. I have said they couldn't do a lot of things they are doing now." Another said, "If the blind can perform certain operations in school, why not in industry? I believe their possibilities are unlimited if we can provide them with the information needed to do the job."

#### Adaptability to Occupational Environment

Our concern here will be with the nature of the restrictions which may impede the worker in the performance of his job, in getting around the plant, and in getting to and from work. Was it possible for the blind workers in the Vines Equipment Company to carry on their work from day to day without being a great personal care to other workers and to management? What special problems did their blindness create for them? Did they need sighted assistance in the performance of their jobs? Did they need assistance in getting around the plant, and in going to and from work?

It should be understood that workers are performing jobs in which they have proved their ability and are not engaged in any tasks which are beyond their limitations. Therefore, it follows that they will have





achieved a considerable amount of independence from any assistance in performing these jobs. Through the system of job breakdown certain operations are found which are suited to the limitations of the blind. The degree of independence achieved by blind workers is largely conditioned by the care with which this job breakdown is made.

The fitting of a handicapped person to his job demands that there be a breakdown of requirements for all jobs in specific relationship to the exact procedure required such as the degree of skill and strength demanded and working conditions which surround the job. Dovetailing with the job analysis there must be an equally detailed analysis of the capability of the worker. When these frameworks have been established, adaptation of the handicapped worker to the job becomes relatively simple.<sup>7</sup>

One worker evidenced a knowledge of this point when she remarked, "There is almost no job which does not require assistance if it is not properly analyzed." On the other hand, if the jobs are properly analyzed by a person with intelligence and imagination the range of jobs is correspondingly broadened. The care with which job breakdowns could be made in the Mines Equipment Company was limited due primarily to the emergency nature of the work which entailed constantly changing operations. It was also limited by the fact that the plant had no authoritative guidance on job analysis by a person trained and familiar with the types of work which are most suitable to blind workers. In addition, no blind persons had been employed in the plant previously. Consequently, management was unaware of the types of work most suitable for visually handicapped persons, as well as their capabilities when they were first employed. In both of these regards management had to learn through experimentation with jobs. Considering these limitations, the jobs were

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<sup>7</sup>"Fitting Handicapped Workers to Jobs," Journal of American Medical Association, January to April, 1943, p. 681.





well selected.

Insofar as could be ascertained there were only two operations performed by blind workers which required assistance beyond that which is normally required by all workers. These operations were packing green and red flashlight filters and stamping tags. In regard to the first operation the only means of differentiating the filters was by sight, as they were of the same size and thickness. In regard to the operation of stamping tags there was no means of identifying the side on which the printed material appeared except by sight. Under these conditions, these two operations are considered to be outside the province of blind workers. However, the amount of assistance needed on the successful performance of these two operations was slight. A sighted person quickly differentiated the material and the blind worker devised his own means of arranging the material so that he would be able to identify it quickly and accurately.

With the exception of these two operations, all blind workers achieved complete independence in the actual performance of their jobs. They developed a system of setting up their material and arranging their work so that extra assistance would not become necessary. The only assistance they really needed was in getting and replenishing their supply of materials, but since it was one of the functions of the supervisors to provide materials to all workers this presented no problem. Most sighted workers would replenish their supply when it ran out, however, whereas blind workers were usually limited in this regard. According to the workers the supply of materials was ordinarily shifted from one place to another in the department during the course of a day so that it could only be detected by sight. When the supply was kept in a definite place and away from dangerous obstacles the blind worker would





get his own materials as he needed them.

Incidental to the actual performance of the job, but related to it, blind workers need sighted assistance in two respects. First, their time cards must be rung in when they appear for work, and rung out when they leave the plant. Second, the time sheet must be filled out after the completion of each operation and at the end of the day's work. Other workers are very thoughtful about ringing the blind workers in and out at the same time they are doing this for themselves, and consider it no extra trouble. Supervisors usually fill out the time sheets for them.

The restrictions which blindness places upon the freedom of movement is generally conceded by blind persons themselves to be their most serious limitation. But even this can be overcome, as evidenced by workers in this study, by developing a good sense of direction and memory, and using a cane as a guide.

As to their independence in getting around the plant, all of the workers were able to orient themselves to their immediate surroundings in a short time and find their way about that area without difficulty. By observing their surroundings they soon built up a mental picture of the arrangement of equipment within a room. They relied upon mental images for the observation of things sighted people get through sight. As long as equipment remained stationary, the blind moved about with confidence and safety.

However, movement over a larger area depended on the freedom of that area from obstructions. For example, some departments are relatively quiet, and there are no moving objects to be found in their aisles. Blind workers can move about such departments with relative ease. On the other hand, aisles of departments like the machine shop are usually full of





stacks of materials and moving objects such as trucks. Here the blind worker would find it hazardous to venture more than a few feet from his job without assistance. The roar of machines in the machine shop doubles the hazard because it makes it difficult for the blind to hear approaching persons or objects.

The amount of vision possessed by the worker also has much to do with the independence with which he can move about. Two workers were able to travel with confidence and safety to any part of the plant, inasmuch as they had sufficient vision to enable them to detect large objects. They did not see all of the obstacles or the arrangement of the plant clearly, but by coordinating all of their senses with their small degree of vision, they were able to avoid danger. On the other hand, one worker who is both deaf and blind, was cautious about moving about at all. In his own words, "I do not risk moving about by myself." Between these two extremes fell the other blind workers, all of whom moved independently about the areas involved in their immediate jobs, but who got assistance when moving to remote or dangerous areas of the plant.

However, it was seldom necessary for blind workers to travel into dangerous or remote parts of the plant. When it did become necessary, it did not present a problem because of the friendliness and willingness of sighted workers to assist them. As one worker said, "The sighted seem to have things sized up pretty well. They are thoughtful in offering assistance and do not make us feel uncomfortable about it." Supervisors remarked that the amount of time taken by sighted workers in helping the blind was so small as to be of no consequence to the company. Furthermore, in going to rest rooms, drinking fountains and locker rooms,





sighted workers would often drop by on their way and ask the blind if they wanted to go along too. In this way, no extra time was consumed by the sighted in aiding them.

Since sighted workers realized that blind workers could get about more easily if objects were removed from the aisles, it has influenced them in being more careful in keeping the aisles clear. They stopped leaving stacks of material or unused trucks in the aisles, and when it was necessary to leave them, the sighted warned the blind workers of their presence. The supervisors felt, in this way, the blind were a good influence in the plant, spurring the sighted to keep things in better order. "They have taught us what good housekeeping means," one of them said. Another said, "I could show you several plants in St. Louis where blind workers should be employed if for no other reason than to influence sighted workers to keep the aisles clear."<sup>B</sup>

Traveling to and from the plant presented no special problem as the blind workers were accustomed to traveling to all parts of the city. They achieved independence by relying upon their memory and learning little tricks for identification. They learned in advance such things as the direction and change of direction of certain streets, the routes of street cars and busses, where stops were made, how streets and houses or buildings were numbered. Their sensitivity to sound was also helpful in guiding them through traffic and in their choice of bus or car. Some cars were of the old, lumbering variety that made a prodigious noise; whereas others were the quiet streamlined variety. If the car could not be identified by sound, they asked questions and found people willing to

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<sup>B</sup>Clearing of aisles is done wherever possible in this plant. But in some instances, workers are compelled to leave trucks moving about and stacks of material lying around for use. This supervisor was speaking of cases in which aisles were cluttered up out of carelessness.





assist them.

They knew their way from their residence to the streetcar or bus stop, and from the stop nearest the plant to the plant entrance. The only danger was in crossing busy streets. They never risked this without asking for help.<sup>9</sup>

Quiet streets they were able to maneuver without help, by listening for noise of approaching vehicles. In walking, they all use canes that aid them in discovering curbs, steps, or other obstacles.

One worker, who was both blind and deaf, was faced with special problems. He managed to identify his car by the peculiar rumbling vibrations the older car made. He knew the number of twists and turns and never failed to get off at the exact place. He devised a card with letters of the alphabet under the corresponding braille letters. So when he needed help, he would ask questions and produce a card for answer.

### Summary

Management's attitude in considering the employment of blind workers has been that by reason of their visual limitations, the blind workers cannot adapt themselves to industrial processes as easily as sighted workers. Management also has objected to employing handicapped workers because it feels that such employees require too much of the time of other workers and the supervisors in performance of their jobs; and

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<sup>9</sup>Once, two workers in this plant were walking home late one evening. As they neared a busy intersection they found no one around to help them across it. Finally, they heard footsteps, and as the traffic was less busy they decided not to ask for help, but to follow close behind the other pedestrian. They were crossing the street without difficulty, but as they neared the other side, they heard the tapping of a cane against the street curb. Imagine their surprise when they found they were following another blind man!





it is fearful, too, that blind workers will require too much assistance from sighted workers in getting around the plant, as well as to and from work.

Actually, the real limitations of the blind which management must consider in placing them in industry deal with size of the articles which the worker must handle, the impracticality of movement over a considerable area where hazards exist; the limitation involved where determination of color is the sole means of identifying an object; use of adhesive materials, printed matter, and use of gloves or tongs; in the hazard of placing a blind worker in the operation of machines where control is not with the worker; and in operations where metal shavings cut by a machine are large or sharp enough to constitute a hazard to the worker's safety. Such limitations diminish in direct proportion to increase in vision, and this study reveals that limitations are in great part proportionate to the resourcefulness and determination of the person to succeed at his job in spite of his physical handicap. The statistical study made of the eighteen workers in the group under consideration, prove that blind workers are capable of performing a variety of industrial jobs.

With the exception of two operations, packing green and red flashlight filters, and stamping tape, all blind workers achieved complete independence in performance of their jobs. Because they evolved a system of setting up their materials and arranging their work so that extra assistance was unnecessary, the only assistance actually required was in getting and replenishing their supply of materials, and when the supply was kept in a definite place, away from dangerous obstacles, the blind worker procured his own materials. Blind workers needed help in ringing time cards in and out, as well as in filling out time sheets,





but this presented no real difficulty, since other workers attended to the blind workers' cars at the same time they rang their own in and out. And supervisors usually filled out time sheets for the blind.

Although freedom of movement is restricted by blindness, a good sense of direction and memory and the use of a cane overcomes this limitation to a great degree. By building up a mental picture of the arrangement of equipment within a room, all of the workers were able within a short time to find their way about the area without difficulty. When necessary to move to remote or dangerous areas of the plant, blind workers easily obtained assistance. Sighted workers aided the blind, too, by asking them to accompany them to rest rooms, drinking fountains, and locker rooms, thus consuming no extra time on the part of the sighted. The realization that blind workers can move more easily if objects are removed from the aisles has influenced sighted workers to keep things in better order.

Blind workers achieved independence in getting to and from work through the aid of a good memory, sensitivity to sound, and the habit of the blind of constructing images of their surroundings.





## CHAPTER VI

## STATUS IN THE PLANT

The blind workers now feel they are accepted in the plant on an equal basis with sighted workers. The plant does not make any concession to the blind that it does not also make to the sighted, with the possible exception of allowing them to leave five minutes early at lunch hour. Even this concession was granted on a realistic basis, because it prevents holding up lines around refreshment areas. Supervisors feel that this concession has created no resentment or jealousy among sighted workers. The latter realize that it prevents delay. Furthermore, the wages of blind workers are paid on the same basis as sighted workers' — a certain amount per hour for a particular kind of work, regardless of who does it. The supervisors expect the same amount and quality of work from the blind as from the sighted. They are realistic too in demanding the same prompt attendance and general efficiency from all workers, regardless of their handicap. The blind are scattered throughout the plant, as are sighted workers, and are not segregated in any one department. This policy of management has resulted in equalizing the status of blind and sighted workers.

The production manager has insisted, both in his conference with supervisors and in his frank discussions with the workers themselves, that this non-discriminatory policy be pursued. The statement of one supervisor is typical: "There is no discrimination made between the blind and the sighted. The blind are not considered as being different. They





are just one of the employees, unless they happen to set themselves off." The reaction of one of the workers is typical of their attitude toward this treatment: "In the plant we are treated as equals. Our work is criticized as severely as that of the sighted worker."

Formerly, blind workers were not accepted as well as they are now. When they first came into the plant, supervisors and workers alike were skeptical. Workers felt it was unfair that handicapped people should earn the same wage they earned. Supervisors were inclined to blame errors on the blind, thinking their handicap would naturally cause them to commit more errors than those whose faculties were intact. An example of this discrimination is revealed by one of the workers. He said:

Once, when the Vulcanizing Department was filling a rush order for bags of rubber and metal insulation sleeves, sighted workers were called in to help the blind workers. It was discovered the next day that some of the bags were too heavy. One of the sighted workers said, "This was done by those blind people." The supervisor was inclined to agree with the sighted worker, but to render justice to the blind, he decided to check the operation, and discovered that not a single overweighted bag had been filled by blind workers.

This early skepticism on the part of management is understandable. It is explained by lack of familiarity with the capabilities of the blind, and ignorance of what they could do. A period of experimentation was necessary to reveal to management the capabilities of the blind, and the types of work to which they were best fitted.

Also, the reaction of sighted workers when the blind first came into the plant was the traditional one of fear and compassion. Sighted workers felt awkward in their presence, and considered the blind as different from themselves, living in a world foreign to their own. They felt strange around the blind, and showed an exaggerated pity. The evidence of blindness in another person tended to arouse fear, in the





sense that the presence of a blind person was a reminder that they could become blind themselves. This depressed the sighted workers, and tended to alienate them from any satisfactory communication with the blind.

However, the blind helped along a friendly relationship by easing the fears of the sighted that they might offend the blind. As one worker said, "We helped to establish a better understanding by acting normal, and by showing we did not feel sorry for ourselves. We even joked about being blind to put the sighted at ease."

Blind workers tend to discourage the granting of any concessions for fear the sighted will think them privileged. For this reason, many bring their own lunch and do not take advantage of the five minute earlier lunch hour concession. Further, as one worker stated, "Management does not need to grant any concessions. If they did make concessions, it would be out of pity, and then our work would be reduced to demoralizing charity."

These efforts of the blind have been well repaid. As one worker said, "Now they are casual around us. We like it that way. They are natural, spontaneous and friendly." Another commented, "The department is just one big happy family." One said, "Sighted workers never skip us in taking up collections for new tables, wedding gifts, and war bond drives. In the occasional squabbles that are bound to occur when lots of people work together, they never hesitate to tell us exactly what they think." Another said, "Their attitude is natural. When they do help us, they don't give it a second thought. There is no big about heroics about it."

As one worker said,

Sighted workers consider a blind worker as one of them. They are friendly and considerate but not





overly-attentive or protective. They are realistic in understanding our limitations and therefore offer assistance when necessary to give it. But this is done in a natural, friendly way. It is not done in a charitable spirit. They ask the blind to go out to lunch, have a coke, and stop by for a chat, just as they would with their sighted friends.

Another worker says, "They are friendly and considerate. They don't give unnecessary assistance, or force protective assistance upon the blind."

One commented, "They treat us as regular guys. I get along swell with them, even kid with them. They make me feel one of the gang."

### Summary

No concessions are made to blind workers in the plant that are not made to sighted workers. Wages are paid on the same basis, and the same amount and quality of work is demanded; nor is any allowance made where prompt attendance and general efficiency are concerned. The result is that the status of the blind workers has been equalized with sighted workers.

Although sighted workers tended to pity and to resent blind workers during their first few months of employment, and although management at first was skeptical as to the capabilities of the blind, the blind themselves finally overcame these unfavorable attitudes. This was achieved through the efforts of the blind to establish a better understanding by acting perfectly normal, and by showing that they entertained no self-pity. They made sighted workers understand that there was to be no difference in the way in which they were to be treated. They proved to their sighted co-workers that their handicap formed no barrier in their relationship.





## CHAPTER VII

## WORKERS' REACTIONS TO EMPLOYMENT IN REGULAR INDUSTRY

The more objective aspects of the adjustment of blind workers to employment at the Wines Equipment Company have been considered: types of work performed; ways in which the blind have adapted themselves to their work and to the factory environment; evaluation of their performance from the standpoint of quantity, quality, and efficiency; the rate of accident of the blind worker in industrial work. The discussion of these points has helped to build a picture of how blind workers fit into industry. This study, however, would be incomplete if it neglected the personal reaction of these blind workers to their present employment.

(1) What motives prompted them to seek employment in regular industry?  
(2) What is their attitude towards their jobs and towards working with the sighted? (3) Do they feel their jobs will end when the reservoir of normal workers is sufficient to supply the regular needs of industry? Or do they think they will stand an equal chance with the sighted in holding on to their present jobs?

Why did these eighteen workers, only half of whom were interested in industrial jobs, select this type of employment? Why did the half who wanted to enter such fields as law, social work, radio, teaching, therapeutic massage and rehabilitation of the blind, enter industrial work? The question takes on added significance in view of the fact that six of these workers were professionally qualified to enter their chosen fields.





The answer is not hard to find. When these workers tried to enter their chosen fields, they were faced with society's lack of confidence in the blind. As a result, starvation threatened unless they turned elsewhere. Those interested in industrial jobs were also restricted in opportunity, and for the same reason — society's mistrust of the blind as workers. The jobs they were able to obtain were poorly paid, and of temporary status.

The primary reason of both groups for securing jobs at the Mines Equipment Company was the fact that the work paid sufficiently well to make them self supporting. All else was subordinated to this vital consideration. There were other motives, however, important to these workers. The new job was a challenge to prove their capabilities in competition with the sighted. It was the first time in St. Louis that an industrial plant had admitted so many blind workers. These blind workers believed that not only could they establish a place for themselves in industry, but that in so doing, they would open doors to their fellow blind. They counted on breaking down barriers that block the employment of blind persons in industry. In addition, they genuinely desired to make a contribution to the nation's war effort.

#### Reasons for Obtaining Employment at the Mines Equipment Company

As pointed out, the strongest motive of these blind workers in obtaining employment at the Mines Equipment Company was to become economically self-sufficient. Inasmuch as employment opportunities for blind persons have been so limited in the past, they have been compelled to confine themselves to the types of work traditionally open to them. The traditional occupations seldom paid a living wage, and just as seldom





suited the abilities or interests of the blind. A glance at the following chart, showing the types of work these workers were engaged in before their present jobs, will reveal why most of these persons jumped at the first opportunity opened to them to better their economic status.

In looking over previous employment records, we see that their past jobs did not yield a living wage. They were so poorly paid that in eleven out of eighteen cases, the wage had to be supplemented by state pensions. Furthermore, out of five other persons who were not eligible to receive pensions, three relied upon their families for support.<sup>1</sup> This leaves us, therefore, with only four persons actually able to earn a satisfactory wage. Even here, normal wage conditions did not prevail. For instance, one of the four was engaged in a W.P.A. job which closed. Another was employed in a sheltered workshop, which he desired to leave so that he could enjoy more companionship with sighted persons. And the other two had obtained industrial jobs after the beginning of the war emergency, when employment opportunities were greater than ever before.

If the reader will contrast the income of blind workers revealed in the chart with their present income at Mines Equipment Company, the economic motive will become immediately apparent. Every blind worker now makes a minimum of sixty cents an hour, working a forty-eight-hour week. However, many work a fifty-four-hour week, making time and a half overtime for the extra six hours. In addition, the worker receives automatic increases every few months until he makes seventy-five cents an hour. Advance in wage over this figure depends on the worker's

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<sup>1</sup>Degree of vision not low enough to be eligible. To be eligible for blind pension in Missouri, applicant must not have vision greater than light perception, nor ability to distinguish more than the motion of the hand at a distance not greater than one foot from the eye.







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JOB LAST HELD BEFORE OBTAINING EMPLO  
WITH WAGE, REASON FOR LEAVING,

Worker	after losing sight	Wage	Reason for leaving
A	own law practice	under \$600 per annum	irregular and inadequate wage
B	sheltered workshop	\$9 weekly	inadequate wage
C	sheltered workshop	\$11.50 weekly	inadequate wage
D	sheltered workshop	70 cents per hour	desire to work with sighted
E	door to door selling	60 cents to \$2.50 per day	inadequate wage
F	own handicraft shop	\$15 per month	inadequate wage and forced to close business
G	dictaphone operator	\$50 per month	inadequate wage
H	selling cards	small and irregular	inadequate wage
I	industry (after start of war)	50 cents per hour	for better pay
J	chair caning industry (after start of war)	\$50 per month 40 cents per hour	inadequate income dissatisfied
K	W.P.A. home teacher	69 to 76 cents per hour 30 hour week	W.P.A. job closed
L	masseur	\$85 per month	inadequate income
M	sheltered workshop	\$11 per week	inadequate income
N	sheltered workshop	\$11 per week	inadequate income
O	unemployed teacher of blind school	...	...
P	unemployed since sight lost	...	...



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MENT AT THE MINES EQUIPMENT COMPANY  
AND PUBLIC ASSISTANCE RECEIVED

Public Assistance		Other Assistance
Received	Not Received	
Pension 7 years		
Pension 1 year		Other financial assistance during illness and lulls in work, from Catholic Charities
Pension 16 years		
Pension 2 years		
Pension 3 years		
Pension 4 years		
		Supported by family when out of work
	Not eligible for pension	Supported by family
	Not eligible	
Pension 17 years		
Pension 1 year		
	Not eligible	
Pension 3 years		
Pension 5 years		
Pension 2 years		
	Not eligible	
		Supported by family
	Not eligible for pension	Supported by family





demonstration of outstanding merit.

The desire to become economically self-sufficient was not altogether an economic motive. In addition to desiring a satisfactory wage, these workers wanted to escape humiliating dependence on state or federal aids, whether in the form of pensions or subsidized jobs. A glance at the chart will show that in addition to the eleven who received pensions, many others were previously engaged in subsidized jobs. The chart shows that five of the workers earned incomes in sheltered workshops, which are subsidized by the state. Although one worker is listed in the chart as working under W.P.A. actually four have worked at one time or another under W.P.A. which is a federally subsidized project.

A second motive for obtaining industrial employment was the desire to establish a place in industry for all the blind. These blind persons working at Mines Equipment Company felt that all visually handicapped people were on trial with them. They hoped to give proof of their abilities that would spread beyond this plant to other plants throughout the country, and would influence those other plants to hire blind workers. They were aware of the fact that employers are inclined to generalize from the experience of a few, and they realized that their success or failure in the Mines Equipment Company might determine the future of many blind persons in industry. These crusading workers were imbued with a spirit of "noblesse oblige" toward their fellow blind who, they knew from their own experience, were employable though not as yet employed. One worker expressed the thought in this manner: "Every responsible blind person has a feeling that his record is indirectly important to all blind people. Blind persons have every reason for doing as well as possible." Another said,

This job means a responsibility to me in that all blind





workers currently employed in industry are paving the way for blind workers in the future. According to their success or failure they are either creating or ruining opportunities for other blind workers.

Neither were they unmindful of their responsibility in paving the way for the employment of returning blind soldiers.

While the worker's primary motive was to earn enough to make himself and his family independent, all of them nevertheless cited their desire to contribute something to winning the war. One worker even stated, "It is a great satisfaction to be able to do something in the war effort. It means more than actual financial compensation to me." The male workers, particularly, felt, since their handicap had denied them the opportunity to fight in the armed forces, that here was a chance to serve their country effectively in another way. The feeling of being a part of their country was a new experience to many of them. Most of the workers had never before enjoyed the satisfaction of being a responsible part of local or federal government. Now, each one felt that he, himself, was making a real and important contribution to his country. The products the workers were producing were badly needed by the nation's war economy. They were no longer producing "luxury" goods in markets stimulated by charitable organizations.

#### Attitude Towards Their Work

There was variation among workers as to enjoyment of their present jobs. Some were enthusiastic while others considered their jobs as monotonous. Comments ranged from "my work is simple, requiring little thought, and therefore becomes monotonous in a short time," to "I love my work....I can get into a kind of rhythm in it."

However, whether or not one liked his job or not did not seem to





matter. As one worker said,

I like my work because there is sense to it, but even if I did not like it, I still would try to do it to the best of my ability. The blind have to be more conscientious than the sighted because their opportunities are more limited.

Any displeasure or dissatisfaction was compensated by the fact that they were earning a living, that they were convincing the sighted of their ability, and that they were making vital contributions to the war effort. The most boring job could not eclipse the feeling of self-respect, of self-confidence and of being a normal person, which the blind worker experienced in the performance of his present task.

#### Attitude Towards Working with Sighted People

Working with the sighted has had four advantages for these blind workers: (1) It has made them feel like normal human beings; (2) it has increased their confidence in themselves; (3) it has restored their self-respect; and (4) it has provided them with an opportunity to bring about a better understanding between the sighted and the sightless.

The first item, that it has made them feel like normal human beings, is highly important, psychologically. In the past, they were too often segregated from other people, by being placed in sheltered workshops or other occupations adapted to their handicap. Therefore, they were continually associating with blind people exclusively and missing altogether the salutary influence that comes from working with the sighted. In addition, the fact that sheltered workshop jobs are designed to meet their handicap made these jobs a constant reminder of their blindness. In contrast to this, while working at the Vines Equipment Company, they became less and less conscious of being blind. This feeling





of becoming more normal was realized in several ways. First, they had to spend so much energy and attention upon the task of minimizing their handicap in the eyes of management, that they were less conscious of actually being blind. Second, association with normal workers, eating lunch with them, having cokes together, kidding each other, even joking about blindness, all tended to close the gap between the world of the blind and the sighted. Third, they have the feeling now that they are sharing in and contributing to the economic life of the country just as any other worker.

The second item, that it has increased confidence in themselves, is also important psychologically. The fact that these workers were able to do well a job for which sight was once considered necessary, and in some cases do this job even better than the sighted, tremendously increased their belief in themselves. Furthermore, they proved to themselves they could minimize their handicap by making a successful adaptation to their jobs and their occupational environment.

The increase of their self-respect is another advantage accruing to these blind workers. They now have the feeling that they are entitled to their wage, in contrast to the gratuitous wages they had received in subsidized occupations. Furthermore, they feel they are producing a useful product, rather than expending time and energy on articles of questionable or luxury value. The former occupations gave them the feeling they were in the back waters of our economic life rather than in the main current.

The fourth advantage is the realization here of better understanding between the blind and the sighted. At the Mines Equipment Company the sighted workers are having the opportunity to learn the ways, habits, and





interests of the blind. In this plant, the gulf that normally exists between the sighted and the blind, because of lack of understanding of the other's mind and personality, is being narrowed. The result is that blind and sighted workers alike are discovering the strong bond of humanity that binds them, to which all physical characteristics are incidental. It is encouraging to see this understanding, badly needed on all social levels, taking place first in industry.

### Stability of Industrial Employment

How long will my job last? This is one of the questions ever present in the minds of these workers. The production manager stated quite frankly at the time of hiring that jobs would be on a wartime basis. Since he did not know what the opportunities of the plant would be after the war he could make no permanent assurances. Last summer, when work slowed down, he called the blind employees into his office and told them if it became necessary to lay off workers he would consider first seniority, reliability, and family responsibilities. However, he expressed himself as satisfied with their work, and promised to employ them as long as he could.

It was estimated that approximately 95 per cent of the plant's production was based on government orders. When these orders terminate, the plant will face an unstable period of reconversion to peacetime production. The future employment of blind workers, therefore, will depend much on whether orders terminate suddenly, or whether a slowly dwindling supply of orders is accompanied by partial conversion to peacetime production. Indications are that many of them face loss of jobs during reconversion.

The insecurity of their jobs affects blind workers in various





ways. On the whole, that insecurity has spurred most blind workers to achievements calculated to impress management with their worth. In a few cases, the result of insecurity has been to increase the feeling that after all, they are employed only as a last resort.

Most of them, putting faith in the production manager's statement that their work records at the plant will determine in a large measure who will be retained, are exerting their efforts to be among the chosen few. As one worker said, "The pressure of this necessity is with me in every operation I do. I am constantly striving to perform the job to the best of my ability." They feel also that if they are to be considered in competition with sighted workers, they must make records now that will impress management with their capabilities. As one worker remarked, "The blind had better have records superior to those of the sighted if their handicap is to be minimized." Some workers feel that the present demonstration of their abilities in competition with the sighted will make it easier for them either to continue employment here or secure it elsewhere. Many think that the production manager will give due consideration to the blind, remembering that sighted workers can get jobs more easily. Others, less optimistic, feel that there will be a slim chance for them in competition with a large supply of sighted workers. As one of them said, "Most companies haven't bothered with the blind. Even if the blind do superior work, I doubt if this will increase our chances."

As to the stability of the blind worker's employment at this plant, jobs are guaranteed only during the war emergency. The prediction of employment opportunities after that period enters the field of pure conjecture. The assurances of the production manager that some blind





workers will be retained, and the conditions governing their future employment are so hedged about with uncertainties that no conclusions can be drawn. Indications are that if our economy follows the pattern it did after the last war, production will slacken and employment will drop. The result will be that some of the nation's labor supply will go unused. Whether the blind worker will be among this group of unemployed is a question that is again conjectural. It is significant that blind workers in this plant feel their employment opportunities, even in wartime, are so much more limited than for sighted workers that they work doubly hard to hold on to their present jobs. As one worker said, "If I lose my present job, there are few other places I can turn to for employment."

### Summary

The primary reason that the blind workers in this study sought industrial work at Mines Equipment Company was that the work was sufficiently remunerative to enable them to be self-supporting. They recognized too, that the opportunity offered them in the plant would give them a chance to prove their capabilities in competition with the sighted, as well as to establish a place for themselves and other blind persons in industry. They also felt that through their jobs at Mines Equipment Company they would be making a real contribution to the war effort.

Some of the workers were highly enthusiastic about their jobs, while others considered them monotonous. But even if a worker was dissatisfied with the job itself, he was compensated by the fact that the job contributed greatly to his self-respect and self-confidence, enabling him to earn a living wage, and proving to sighted persons that he had real ability to do industrial work.





The association with sighted persons has benefited blind workers in that it has made them feel like normal human beings; has increased self-confidence; restored self-respect; and enabled them to bring about a better understanding between blind and sighted.

Jobs at Mines Equipment Company are guaranteed only for the emergency period of the war. Future employment on a permanent basis is not promised by the management except for the statement made by the production manager that some blind workers will be retained. Generally speaking, this situation has influenced the workers to do work so outstanding that management would be impressed with blind workers' capabilities, even in comparison with work done by sighted employees. It is felt by blind workers that despite wartime labor conditions, their job opportunities are so limited that it behooves them to redouble their efforts toward doing excellent jobs. Whether the blind will be among the unemployed group that decreased production will cause after the war is a matter of conjecture.





## CHAPTER VIII

## SUMMARY AND CONCLUSIONS

In the foreword three questions were asked: (1) Have the blind been able to adapt themselves to the rigid demands and swift pace of mechanized industry? (2) Are blind persons justified in believing they can become normal employees who assume responsibilities and contribute to production on an equal basis with the sighted? (3) Will they be able to retain their present place in industry and continue to find new opportunities after the war? On the basis of the facts obtained in this study these questions can now be answered.

The eighteen blind workers at the Mines Equipment Company have proved their ability to adapt themselves to the rigid demands and swift pace of mechanized industry. They have earned the right to be considered on an equal basis with sighted workers. In an industry which was not designed to meet their handicap, but geared to wartime needs, they have learned to perform numerous industrial processes, developed versatility in shifting from one job to another, and have executed their work with precision, speed, and efficiency.

During fifteen months of employment they have performed over 150 operations embodied in eight different job classifications. These classifications included inspection, assembly, machine operations, supervision, packing, repair and maintenance, clerical, and odd jobs. The types of jobs assigned to them have increased as they demonstrated their ability to perform them and as management has become aware of their competence.





Blind workers and supervisors realized that the range of jobs was more limited for the blind than for the sighted. They also recognized the importance of resourcefulness and interest in broadening this range. Jobs from which they were at first excluded because sight was thought to be essential, were later performed by the blind who devised ingenious ways of minimizing their handicap. By drawing upon imagination and memory, with the use of their four remaining senses they were enabled to perform many and varied jobs. Despite their handicap they were able to adapt themselves to the quickly changing war needs which called for sudden shifts from one job to another. This demonstration of versatility caused one supervisor to comment: "I am extremely optimistic about the possibilities of jobs open to blind individuals who show interest, intelligence, and imagination."

They have not only convinced management of their ability to perform a large number and variety of jobs, but also that they can perform them as successfully as sighted workers. They have established and maintained an excellent record at the plant by meeting production standards in all instances, and in many cases surpassing the production of sighted workers.

The first two blind workers employed by the company on their first job doubled the output of the four sighted workers who had preceded them. One worker, who is both blind and deaf, achieved such a high rate of production on drilling and tapping yokes that two sighted workers, who were performing the same operations, have been released. His rate of output doubled that of the fastest sighted worker on drilling, and tripled that of the fastest sighted worker on tapping. His supervisor believes he still has not reached his maximum output, since it is





constantly increasing.

Another blind worker consistently assembled springs to caps faster than sighted workers. His average output was 262 per hour, while the average rate of the sighted worker was 150 per hour. This same worker increased the rate of production on reaming center holes on fiber contacts from the peak rate of 434 per hour, achieved by a sighted worker, to 8,000 per hour by ingeniously devising a method whereby eight contacts could be reamed at one time. Even before devising this method his hourly rate of output exceeded that of the sighted worker by 205. This blind worker consistently maintained an unusually high production rate on every operation he performed.

These are but a few examples, but they are characteristic of the accomplishments of these blind workers. Along with their high rate of output went a high rate of accuracy. The workers themselves expressed the belief that their rate of accuracy was superior to that of the sighted on some operations, particularly those performed in the jobs of inspection and packing. Their sensitive tactual perception enabled them to discover errors which occasionally passed sighted observation. Management confirmed their belief. All supervisors agreed that the work of the blind was of superior quality. The production manager asserted: "When properly placed, blind workers will produce one third more than the sighted, and their work is above the standard in accuracy."

These blind workers are justified in believing they can become normal employees who assume responsibilities and contribute to production on an equal basis with the sighted. The evidence just given is their justification. Furthermore, they have achieved a high degree of independence in the performance of their jobs, in getting around their work





areas, and in going to and from the plant. They have verified the assumption that blind persons do not need special assistance when placed on jobs where sight is not an absolute requirement. They have not asked for special privileges or concessions, as they desired to be considered on an equal basis with the sighted workers. Management has shared their view and helped to equalize their status by insisting upon the same quantity and quality of work, and the same promptness and regularity of attendance as that expected of the sighted.

What motives led these blind workers to adapt themselves so effectively to industrial jobs? What qualities made possible that adaptation? The source of their ability to achieve the high rate of speed, accuracy, and efficiency which they demonstrated was the outgrowth of their blindness. A blind person, to be independent, must learn to do things through touch rather than sight. Where the sighted need only their eyes, the blind must use their minds. They must cultivate an excellent memory for they can not rely on casual observation to serve them. They must be orderly to achieve any kind of freedom. Without order they are dependant on the sighted. They must have definite places for things, and count on finding them there. Consequently, they become methodical, even meticulous about the things they use. This is to their advantage in industrial work. Their materials are never in disarray, but arranged in orderly fashion. Images of materials and patterns of action are present in their minds. As a result, the time and motions spent in performing an operation are reduced to a minimum. One discerning supervisor commented: "I believe after a person has made an adjustment to blindness, it is a gain -- not a loss." He went on to say that sighted workers could learn much about order and system and attention to the





operation at hand from the blind; that industry also could profit. He said: "The blind are an asset because of their salutary effect upon sighted workers."

A powerful drive was behind every operation they performed. It was the potent reason for their high accomplishment. From their point of view it was imperative to establish the best work record possible while they had the opportunity to do so to win recognition and confidence from their own and other employers. They believed their future depended on the kind of recognition and confidence they gained there. By doing an excellent job and thus convincing their employers of their competence, they felt they would be breaking down barriers to employment, not only in industry but in other fields of our economic life. This they were striving to do for their own benefit and for the benefit of other blind persons who were as yet unemployed. They were therefore investing in their jobs a profound zeal and determination to make their future more secure.

But will their future be secure? Will they be able to retain the place they have established for themselves, and will they continue to find new opportunities after the war is over? The question must be faced in full recognition that jobs for the blind in the post-war world will depend not only upon their ability to perform them, but upon the degree of confidence which the sighted world manifests in their ability.

This fact, far more than the economic condition of the country, will determine the employment of the blind. If management is educated to realize the successful performance of the blind in industry then, whether we have a post-war world of full or partial employment, the blind will have their proportionate share of jobs in the labor market.





The question then becomes, how can this confidence be engendered? How can the sighted world be stimulated to recognize the full capacities of employable blind persons and admit them to their place in the main current of our economic life? The answer lies in the education of the public. Employers who are enlightened as to the aptitudes and achievements of the blind will respond more favorably to a consideration of them as employees.

The 2,500 blind persons currently employed in industries are the very source of this enlightenment. The success of their performance should assure the confidence of the sighted. Their achievements have given rise to publicity which has served to inform persons who were unaware of their potentialities. People are discovering that their traditional concept of the blind as helpless persons who must rely upon charitable aids for their livelihood is erroneous. It is being replaced by a new and more rational concept which views the blind as resourceful persons who are able to transcend their handicap and thus lead normal, useful lives. This is an excellent beginning, but the publicity to educate the sighted must continue in an organized way if the blind are to retain the place they now hold.

The existing organizations serving the blind are in a position to carry on such an educational campaign. The radio, movies, and various publications can be utilized effectively to strengthen and spread the new concept which is now evolving. Particular attention should be directed to the employer group, since the primary objective of an educational campaign would be to open up new work opportunities for the blind.

The most effective means of educating the employer group is





through personal demonstrations by blind persons. Employers can see for themselves through first hand observation how other faculties are substituted for the sense of sight. The soundness of this approach was realized by J. F. Clunk, Chief of Services for the Blind, Federal Security Agency, a few years ago when he encouraged the incorporation of blind placement agents in the staff of state agencies serving the blind. New Jersey was the first to inaugurate the program. Other states have followed until there are at present thirty-two blind industrial placement agents in the United States. The function of these agents is to interest employers in the hiring of blind persons by personally demonstrating ability to perform suitable jobs within the industry. The skepticism of employers fades as they watch the performance of these operations and as the blind agents explain their methods of procedure. New work opportunities have resulted from this kind of educational program. Its adoption by all states would greatly further the employment of the blind.

The need of educating the public becomes even more pressing at this moment because of the number of men who will return from the battlefronts without sight. When these men come home they will want to resume their former lives in as normal a way as possible, even though handicapped. The nation has faced the fact that they will desire employment in many varied fields upon their return, and is endeavoring to make that possible by providing training that will prepare them to enter the field of their choice. The Army, Navy, Veterans' Administration, and Office of Vocational Rehabilitation have set up programs for the rehabilitation and training of the war blind. Excellent plans are being made with advice from agencies long experienced in work for the





blind. They are coordinating their efforts in the formulation and carrying out of an over-all program which will wisely steer and help the individual from the day he is certain of his blindness to the day he seeks to reenter society as a contributor with the responsibility of earning his own living. The motivating philosophy behind this program is a positive, constructive one which recognizes the individuality of interests and aptitudes. It therefore molds the education and training to fit the individual instead of imposing a rigid and limited vocational pattern upon him.

But government can provide only the means of obtaining skills. It can not provide the jobs. In a free society only the voluntary cooperation of the employer group will bring to completion a great government program. This fact places the ultimate responsibility upon the sighted public.

Training then, no matter how important, is not the final goal. The problem is only half solved when the training is ended. Jobs — opportunities to work in fields which are commensurate with training, ability, and interests — are the desired and final goal. No matter how excellent or thorough his preparation, how capable or interested he is, the blind worker will not secure employment unless the employer subordinates the fact of his blindness to his qualifications as an employee. The employer can do this only after he has been enlightened. Through his knowledge of the abilities and achievements of the blind, confidence will be engendered. Such confidence will lead to better opportunities for the blind to contribute and share in the main current of our economic life.





## APPENDIX A

## OUTLINE FOR WORKERS

## A. HOW PRESENT EMPLOYMENT OBTAINED

## B. DESCRIPTION OF JOB

1. Type of work
2. Skills required
3. Length of time required to learn job
4. Method of learning job
5. Area of work
6. Number and variety of operations involved
7. Degree of physical independence achieved in regard to job
8. Degree of independence in regard to:
  - a. Getting about within the plant
  - b. Getting to and from the plant

## C. EVALUATION OF PERFORMANCE

1. Quantity of work
  - a. Relation of output to plant standards of production
  - b. Comparison with production of sighted workers
2. Quality of work
  - a. Relation of rate of error with plant standard
  - b. Comparison with rate of error of sighted workers
3. Adaptability to Industrial Processes
  - a. Ability to engage in a variety of operations associated with one job
  - b. Ability to transfer from one job to another
  - c. Ability to perform with speed, precision, and efficiency
4. Ability to discover methods of improvement and submit suggestions to proper authority
5. Frequency of Fatigue and Effect Upon Efficiency

## D. ATTITUDE TOWARDS WORK

1. Enjoyment of work
2. Interest in work
3. Advantages of working with sighted individuals
4. Disadvantages of working with sighted individuals
5. Comparison of status with that of sighted workers
  - a. Acceptance on equal basis with sighted workers
  - b. Discriminations made because of blindness
  - c. Privileges or concessions rendered because of blindness
  - d. Influence of visual handicap on foreman's appraisal of performance
6. Stability and permanence of present employment





## E. REASONS FOR OBTAINING PRESENT EMPLOYMENT

1. To earn money
2. To be employed
3. To work with sighted individuals
4. To learn certain skills
5. To make contribution to war effort

## F. RELATIONSHIP WITH SIGHTED WORKERS

1. Ability to associate with sighted workers
  - a. Mutual participation in recreational activities within plant
  - b. Mutual participation in social activities outside of plant
2. Sighted workers' understanding of physical limitations and offering of assistance

## G. FINANCIAL ADJUSTMENT

1. Source and amount of income prior to present employment
2. Source and amount of income at present time

## H. VOCATIONAL OBJECTIVES

1. Plan to continue present occupation for indefinite period of time
  - a. Desire to continue
  - b. Ability to adapt to peace-time industrial processes
  - c. Opportunity to continue when labor supply abundant
2. Plan to enter some other field of vocational activity
  - a. Type of work
  - b. Availability of employment in desired field
  - c. Qualifications for entrance into desired field





## APPENDIX B

## OUTLINE FOR SUPERVISOR

## A. DESCRIPTION OF JOB

1. Type of work
  - a. Engaged in by blind worker only
  - b. Engaged in by sighted worker also
2. Length of time required to learn job in comparison with time required for sighted worker
3. Plant provision for training in preparation for job
  - a. Provided for all workers
  - b. Provided for blind workers only because of visual handicap
4. Area of work
5. Number and variety of operations involved
6. Degree of physical independence achieved in regard to job
7. Degree of independence in regard to getting about within the plant
8. Risks involved in job

## B. EVALUATION OF PERFORMANCE

1. Quantity of work
  - a. Relation of output to plant standards of production
  - b. Comparison with production of sighted workers
2. Quality of Work
  - a. Relation of rate of error with plant standards
  - b. Comparison with rate of error with sighted workers
3. Adaptability to Industrial Processes
  - a. Ability to engage in a variety of operations associated with one job
  - b. Ability to transfer from one job to another
  - c. Ability to perform with speed, precision, and efficiency
4. Ability to Discover Methods of Improvement and Submit Suggestions
5. Comparison with Sighted Workers in Regard to:
  - a. Interest in work
  - b. Ability to concentrate on work
  - c. Care with machinery and equipment
6. Rate of Promotion to Superior Jobs in Comparison with Sighted Workers

## C. INFLUENCE OF BLIND WORKERS' ACHIEVEMENT ON SIGHTED WORKERS

1. Incentive to greater effort and efficiency
2. Change observed in quality of work
3. Change observed in quantity of work





## D. COMPARISON OF STATUS WITH THAT OF SIGHTED WORKERS

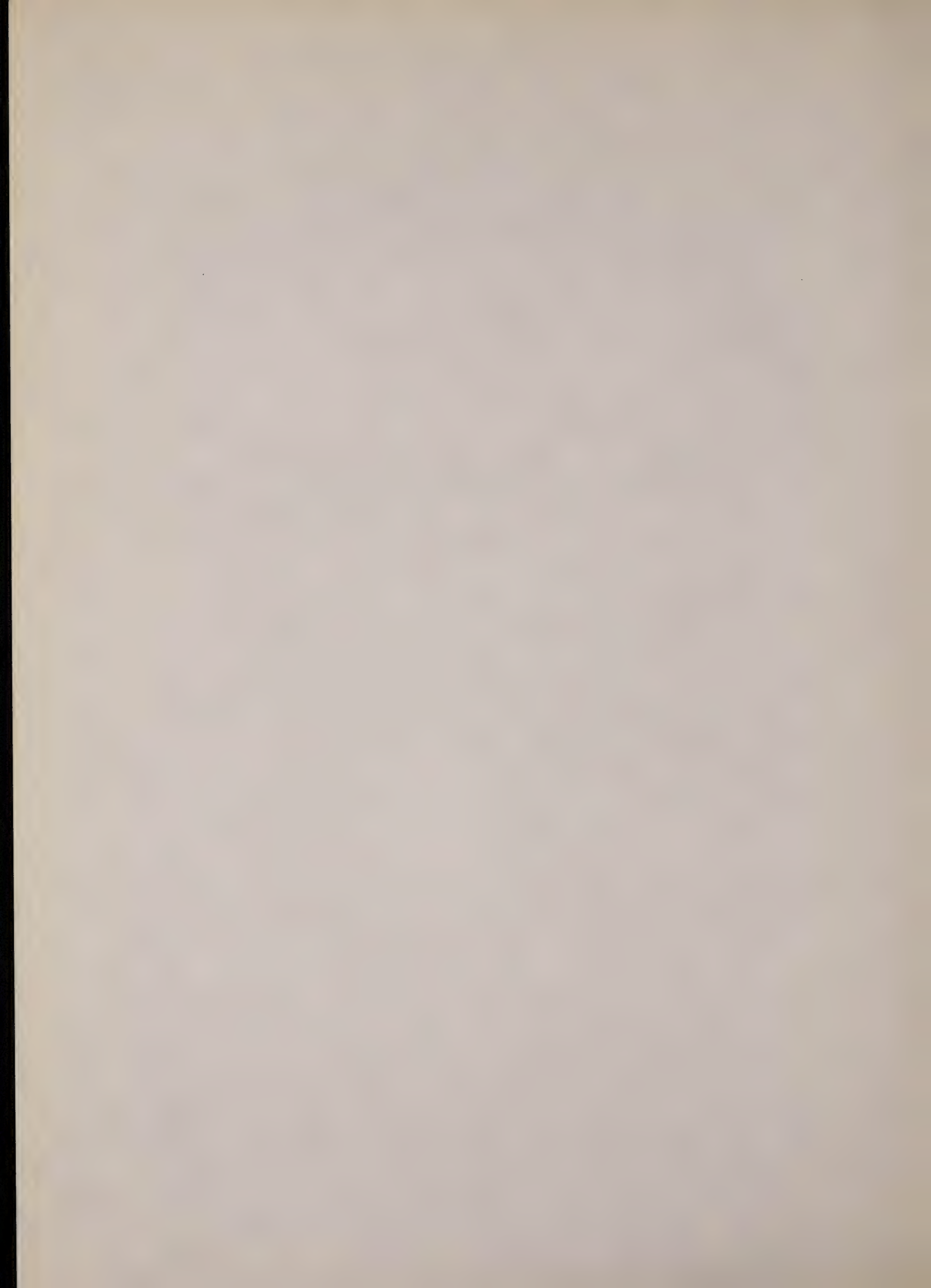
1. Acceptance on equal basis with sighted individuals
2. Discriminations made because of blindness
3. Privileges or concessions rendered because of blindness
4. Influence of worker's visual handicap on appraisal of performance

## E. REGULARITY OF WORK

1. Tardiness
2. Absenteeism

## F. RATE OF PAY

1. Basis of wage
  - a. Piece work
  - b. Time rate
2. Comparison with wage of sighted workers engaged in same type of work





## APPENDIX C

4403 East Pine  
St. Louis, Mo.  
July 2, 1944

Mr. James Miller, Production Manager  
Mines Equipment Co.,  
St. Louis, Mo.

Dear Mr. Miller:

According to your suggestion I am enclosing a list of questions concerning my thesis topic, "The Adjustment of the Blind to Industrial Employment in Competition with the Sighted," for you to answer at your convenience. In order to determine with accuracy and thoroughness the adjustment of the blind to industrial employment, it is necessary to consider it from two points of view: that of the manager, who is chiefly concerned with the maintenance of production at its optimum; and that of the blind worker, who is also concerned with production, but who brings to the employment situation certain limitations imposed on him by his handicap which must be met and overcome successfully if he is to contribute his proper share to the total output of the plant. Through interviews with the workers and their supervisors I have obtained information concerning the types of jobs they have engaged in, an evaluation of their performance as to quality, quantity, and adaptability, and the attitude of the blind worker towards his work. To complete the study I should like to have your own evaluation of their performance, thus dispelling any skepticism that might arise if the work were not appraised from all points of view. I realize this request will take time and attention on your part, but I feel your contribution is a vital part of the study, and will therefore appreciate your consideration of the questions.

Since the employment of the blind is of particular interest to sighted and blind alike at the present time, I am planning to write an article for publication after my thesis has been completed. In the event it is accepted by a publisher, may I have your permission to use your name and the name of your company in the article? I believe others will be impressed, as I have been, not only by the ability of the blind to succeed in doing a variety of jobs well, but also by your encouraging spirit in recognizing the capacity and skill of this potential source of manpower.

I wish to express my appreciation for your generous cooperation on this research project. You and all those associated with management gave helpful assistance and contributed greatly to the content of the study. Enthusiasm for the efficiency of the blind workers seemed to prevail throughout the two plants, and everyone I interviewed in regard to them evidenced not only a willingness to discuss their work with me but a real interest in the subject. The exceptional opportunities

Introduction

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given me to talk to supervisors and foremen in the plant, to see the machines in action, to examine some of the operations performed by the blind, to observe the organization of industrial activity, have enriched my knowledge of industrial processes and the part the blind workers are playing in production. Such opportunities offered a research student in peacetime would be impressive; in the rush of a war job they become outstanding. Your interest in the advancement of opportunities for the blind must explain this unusual generosity.

I should also like to take this occasion to express for all the blind workers employed by the Mines Equipment Company their deep gratitude for the opportunities you have opened up to them. Through your recognition of their skill and your confidence in their ability, you have made it possible for them to secure steady, remunerative employment which has enabled them to become self-supporting, self-respecting individuals. They are hopeful that this work experience may result in convincing the sighted public of the capacity of the blind for participating more generally in industrial employment.

Sincerely yours,

L. Frances Smith





## QUESTIONS FOR PRODUCTION MANAGER

1. What was your attitude towards employing blind persons before you employed them?
2. Has your attitude altered since you have employed them? If so, in what ways?
3. What is your evaluation of the performance of blind workers as to:
  - a. Quantity of work
    1. How does their work measure up to plant standards for production?
    2. How does it compare as to output with that of sighted workers?
  - b. Quality of work
    1. How does their work measure up to plant standards for accuracy?
    2. How does their rate of error compare with that of sighted workers?
  - c. Adaptability
    1. Are they able to engage in a variety of operations associated with one job?
    2. Are they able to transfer from one job to another?
4. Is it necessary to make special provisions for the blind workers?
5. How does the rate of accident of the blind compare with that of the sighted?
6. Do you believe that you will have a place for these workers at the conclusion of the war? If so, do you plan to retain them?





## APPENDIX D

## SCHEDULE FOR BOOKING

DATE OF INTERVIEW: \_\_\_\_\_

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ TELEPHONE NO. \_\_\_\_\_

DATE OF BIRTH: \_\_\_\_\_ PLACE OF BIRTH: \_\_\_\_\_

SEX: \_\_\_\_\_ MARITAL STATUS: SINGLE \_\_\_\_\_ MARRIED \_\_\_\_\_ WIDOWED \_\_\_\_\_ DIVORCED \_\_\_\_\_ SEPARATED \_\_\_\_\_

WHEN BLINDNESS OCCURRED: \_\_\_\_\_ PRESENT DEGREE OF VISION: \_\_\_\_\_

OTHER PHYSICAL DEFECTS: \_\_\_\_\_

VISUAL ACUITY OF SPOUSE: NORMAL VISION \_\_\_\_\_ SERIOUS DEFECT \_\_\_\_\_ NO VISION \_\_\_\_\_

MEMBERS OF HOUSEHOLD:

KINSHIP

DATE OF BIRTH

OCCUPATION

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

EDUCATION:

Before Blindness      SCHOOLS ATTENDED      DATES OF ATTENDANCE      GRADES COMPLETED

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

After Blindness

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_





## VOCATIONAL TRAINING:

PLACE	TYPE OF TRAINING	TIME SPENT	YEAR
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

## PREVIOUS EMPLOYMENT:

PLACE	TYPE OF WORK	RATE OF PAY	DATE EMPLOYED	DATE LEFT	REASON FOR LEAVING
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____

DATE OF EMPLOYMENT WITH MINES EQUIPMENT CO. \_\_\_\_\_

Type of job engaged in at present: \_\_\_\_\_

Types of jobs engaged in since date of employment: \_\_\_\_\_





## APPENDIX E

## DEAF AND BLIND WORKER'S CODE

Because the deaf and blind worker's code is original and interesting, as well as simple and logical, the writer requested him to describe it in his own words. His description of it is presented below.

Visualize a cross drawn on the back of your hand. Call the center of the cross O; the right hand point of the cross R (meaning right); the left hand point of cross L (meaning left); the point of the cross nearest the wrist U (meaning up); and the point nearest the fingers D (meaning down).

There are three kinds of lines used in this code: simple lines, broken lines, and cycles. A simple line is made by moving one's finger from O to R or to any other of the four points of the cross. A broken line is a simple line divided into two segments: move the finger from O to a point about midway between O and an extremity of the cross, pause briefly, then move the finger the rest of the distance to the end of the cross. A cycle is made by moving the finger from O to an extremity of the cross then moving the finger back to O. All lines are more easily interpreted if they are an inch or more in length. It is sometimes difficult to determine the direction of the line if it is too short.

The code is divided into five groups of letters:

- (1.) a, b, c, d,
- (2.) e, f, g, h,
- (3.) i, j, k, l, m, n,
- (4.) o, p, q, r, s, t,
- (5.) u, v, w, x, y, z

The letter a is one tap on O; b is two taps on O; c is three taps on O; and d is four taps on O.

The letter e is a simple line from O to R; f is a broken line from O to R; g is a cycle from O to R; h is a simple line from O to R followed by one tap on R.

The letter i is a simple line from O to L; j is a broken line from O to L; k is a cycle from O to L; l is a simple line from O to L followed by one tap on L; m is a simple line from O to L followed by two taps on L; n is a simple line from O to L followed by three taps on L.

The letter o is a simple line from O to U; p is a broken line from O to U; q is a cycle from O to U; r is a simple line from O to U followed by a tap on U; s is a simple line from O to U followed by two taps on U; t is a simple line from O to U followed by three taps on U.





The letter u is a simple line from O to D; v is a broken line from O to V; w is a cycle from O to V; x is a simple line from O to D followed by one tap on D; y is a simple line from O to D followed by two taps on D; z is a simple line from O to D followed by three taps on D.

Numbers are made by using the first nine letters of the alphabet for the numerals and the letter o for zero. The numbers are made on the back of the fingers so that no confusion will arise between numbers and letters.

On the fingers 1 is made by tapping once; 2 is made by tapping twice; 3 is made by tapping three times; 4 by tapping four times.

The number 5 is a simple line to the right; 6 is a broken line to the right; 7 is a cycle to the right; 8 is a simple line to the right followed by one tap; 9 is a simple line to the left. Zero is a simple line up the finger.

When I became deaf enough to require some manual form of communication I learned the regular manual alphabet that seems to be favored by those who instruct the deaf and deaf-blind. However, it soon became clear that one without sight had to do a considerable amount of groping in order to ascertain the exact position of the hand and fingers of the person talking to him, so I decided to work out a method that would be less awkward for me to decipher. I was faced, also, with the need of a code that would be utterly simple so that as many people as possible would learn it. This was necessary because there was no probability of any one person dedicating his life to the sole task of helping me meet people. In my opinion, the code I hit upon has filled the order beautifully. Seven blind people and eight sighted people at the factory are able to use it; nearly all my blind friends are able to use it too. And my son, who was four years old yesterday, has known it and has been remarkably accurate in using it for the last five weeks. I mention these facts to support my contention that this code can be learned by any willing person. It has another seemingly remarkable feature too. Once learned, it is a job to forget it. I have met people after a year or more of separation and found them rusty but not unintelligible in their coding.

Another admirable feature of this code is that it can be used on any part of the body, so long as right, left, up, and down are distinguishable. It is often convenient to write on my knee, my forearm, my back, etc., and the results are just about as satisfactory as on the hand.





## APPENDIX F

## OPERATIONS PERFORMED UNDER EACH JOB CLASSIFICATION

## I INSPECTION

1. Checking tubes
  - a. Testing with go and no-go gauges
  - b. Checking depth of bell
  - c. Checking total depth of tube
2. Inspecting caps
  - a. Checking diameter
  - b. Checking holes in cap
  - c. Inspecting springs and caps before assembly
3. Inspecting bolts
  - a. Tapping thumbnuts
  - b. Assembling nut to eyebolt
  - c. Testing nut on bolt for tightness
4. Inspecting cover (has same function as cap)
  - a. Checking diameter with go and no-go gauges
  - b. Checking holes in cover
  - c. Testing for slots on side
  - d. Testing springs and cover before assembly
5. Testing switches
  - a. Testing for thread to fit contact with go and no-go gauges
6. Testing miniature lamps
  - a. Gauging for size, depth of lamp base with go and no-go gauge
  - b. Testing in socket
  - c. Testing for looseness of glass in base
7. Gauging threads on collars and rings
8. Gauging threads on studs and screws
9. Inspection of sockets for size with a smooth go and no-go gauge
10. Inspection of pins for length and diameter with a "snap" gauge
11. Checking connector with wall plug gauge (go and no-go gauge)
12. Testing sleeve by running thin wire through hole at each end

## II ASSEMBLY

1. Assembling receptacles
2. Assembling batteries
3. Wrapping uncooked rubber around tubes for vulcanizing
4. Assembling lead cables
5. Putting springs in caps after cleaning springs
6. Assembling terminal outlets
7. Putting caps on small wire cables
8. Putting spring, bolt, and washer between caps and tubes
9. Putting nuts and bolts in terminal blocks





10. Assembling condensers on metal plates
11. Assembling nuts and bolts
12. Assembling connectors
13. Putting on eye bolts
14. Putting rubber sleeves on pins
15. Putting anchor pins on cable
16. Assembling rheostats
17. Putting sleeves on cables and crimping sleeves
18. Putting end plugs on cables
19. Assembling adapters
20. Ringing brass
21. Stringing porcelain beads on wire

### III SUPERVISION

1. Stock room supervisor

### IV MACHINE

1. Operating eyelet machine
2. Operating drill-press
3. Operating tapping machine
4. Operating mold-press (vulcanizing pressman)
5. Operating staking machine (tapping nuts on screws)
6. Use of hand riveting machine
7. Operating hand punch press for forming guards
8. Operating cable cutting machine
9. Operating string cutting machine
10. Operating wire cutting machine
11. Operating reamer

### V PACKING

1. Counting rubber and metal insulations sleeves into specified lots and packing
2. Stapling bags
3. Packing rubber strips
4. Bagging cables
5. Packing spare parts in paraffin coated bags
6. Packing spare parts in metal kits
7. Packing spare parts in boxes
8. Wrapping lamp electrics in wax paper and boxing
9. Packing boxes of rubber tape
10. Packing wire in bags
11. Packing tools in canvas kits
12. Packing beeswax into boxes
13. Sealing Shellmar bags with electric sealer
14. Pasting labels on boxes
15. Stacking boxes
16. Stamping tags
17. Making boxes
18. Labelling bags
19. Taping boxes





## VI REPAIR AND MAINTENANCE

1. Repairing transmitters
2. Repairing soldering outfits
3. Servicing testers
4. Repairing spot welders
5. Repairing equipment used on assembly line
6. Electrical maintenance
7. Oiling trucks
8. Miscellaneous carpentry
9. Mechanical maintenance and repair

## VII CLERICAL

1. Taking inventory in stockroom
2. Issuing stock
3. Assembling materials for workers and for shipping

## VIII ODD JOBS

1. Cutting wire with shears
2. Salvaging wires from desoldered connectors
3. Rolling wire
4. Stripping wire
5. Twisting wire
6. Rolling wire solder into rolls
7. Stripping cable
8. Fainting and sorting cable
9. Cutting cable with shears
10. Pulling tails from cables of various lengths and diameters
11. Coiling cables and tying them
12. Tying tags on cables
13. Pulling end plugs from cables
14. Tacking insulation on mold cradles
15. Picking insulators
16. Tying knots in strings
17. Cutting strings with shears
18. Stringing and wiring tags
19. Tying strings on bags
20. Cutting thermostat wires
21. Filling canvas hooks with rubber strips for use in wrapping connectors





## APPENDIX G

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